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Analysis of timber production and institutional barriers: A case of community forestry in the Terai and Inner-Terai regions of Nepal

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A thesis
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Chandra Bahadur Rai

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Abstract of a thesis submitted in partial fulfilment of the
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By
Chandra Bahadur Rai

Community forestry in Nepal is intended to facilitate both improved forest conditions and the alleviation of poverty, by increasing community participation in forest resource management. While this programme has been successful in improving forest conditions, the economic returns to local people from community forests are not as apparent, especially in the case of the Sal forests in the Terai and Inner-Terai regions of Nepal. Despite having several advantages; high value forest, fertile land, connection with the transportation network, and being close to the regional markets, there is very little timber production from these forests. This research will analyse the problems inherent in the institutional structure of the community forests that would explain why such a high value timber is not being fully utilized. In particular, the research will look at two aspects of the structure. The first is, whether the size of community forests has a negative effect on the efficiency of commercial timber production, and thus whether there is a need to develop cooperative or joint management structures with other user groups. The second aspect of the research is to look at whether the internal management structures of community forest user groups, and relationships with government institutions, affect their ability to make production decisions within the user groups, or affect their ability to make external commercial contracts with other user groups, log buyers, or contractors. The findings of this research are expected to increase the understanding of the timber production process and the institutional problems of community forestry in the Terai region. Research findings may also be helpful in other regions of Nepal, other parts of the world, and other sectors, such as fisheries, where similar resource management settings exist.

Keywords: Community forest, community forest user group, Terai, Sal, timber production, new institutional economics, transaction cost economics, contracting, cooperative.

This thesis is dedicated:

To

my wife Sushila

and

children Ashmita and Bipin

and

To the millions of poor forest users of Nepal
who are managing forests in the hope of a better future!

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Rationale and Objective of Research

1.1 Background of the Research

The Community forest (CF) programme in Nepal is considered one of the most successful programmes, mainly in terms of the social aspect and the forest condition improvement (Agrawal & Ostrom, 2001; J. Carter, 2010; FAO, 2008; Kanel & Dahal, 2008). More than 14,000 community forest user groups (CFUGs) or 35% of the total population (27 million) are managing about 18% of 5.8 million hectares of forest. However, in term of economic performance, the success of community forestry is questionable, especially in Terai – a fertile plain area of Nepal. Kanel and Dahal (2008) reported that the average annual income from community forests of the Terai region was just about Rs1200 per household (equivalent to US$16, at an exchange rate of US$1 equivalent to Rs75).

Forests of the Terai region of Nepal have a huge potential for generating income if managed properly and commercially (Bampton & Cammaert, 2006; Banjade & Paudel, 2008; FAO, 1997). One of the main reasons for this is that the Terai region consists of high value Sal (*Shorea robusta*) forests – a tropical hardwood species used for construction. As well, the Terai region has many comparative advantages such as fertile land, is relatively accessible by road and the existence of local markets. Bampton & Cammaert (2006) argued that the economic potential of Sal forests under community management in the Terai has not been realised.

Before going to the research issue of why an economic benefit has not been realised in the Sal forests under community management, it is worthwhile to give a brief overview of forest management history, and the current institutional set up of community forestry in Nepal. Historically, management ownership of forest resources has been a continuous battle between local people and the state (Bhattarai, Conway, & Shrestha, 2002). For example, before the Forest Nationalisation Act 1957, all forests' management ownerships were under either indigenous or private management systems. The Act had a negative impact on local people that resulted in massive forest destruction (Kanel & Dahal, 2008). In order to reduce forest destruction, the state introduced the community forestry programme through the Master Plan of Forestry Sector (MPFS) in 1989. A later government backed up the community forestry programme with the Forest Act 1993. Based on the MPFS 1989 and Forest Act 1993, the

institutional set up of the CFUG's was made. The study area and the institutional set up of CFUGs are explained in Section 1.2.

1.2 Study area and institutional set up

1.2.1 Introduction to Nepal

Nepal is situated between China to the north and India to the south, on the Asia continent. Its total geographical area is 147,181 square kilometres (kms) and is home to about 27 million people (CBS Govt of Nepal, 2008). In the globe it is located from 26º22' to 30º27'N in latitude and from 80º04' to 88º12'E in longitude.

Ecologically, the country is divided into three main ecological regions – Terai, Hill, and Mountain, Figure 1.1. Some prefer to divide the country into five ecological regions – Terai, Siwalik, Middle Mountain, High Mountain, and High Himalayas, (FAO, 2008; Gautam, Shivakoti, & Webb, 2004a; Pokharel & Amatya, 2000). The Siwalik region is also called the Churia region (Laubmeier & Warth, 2004) and/or Inner-Terai region (Pokharel & Amatya, 2000) .

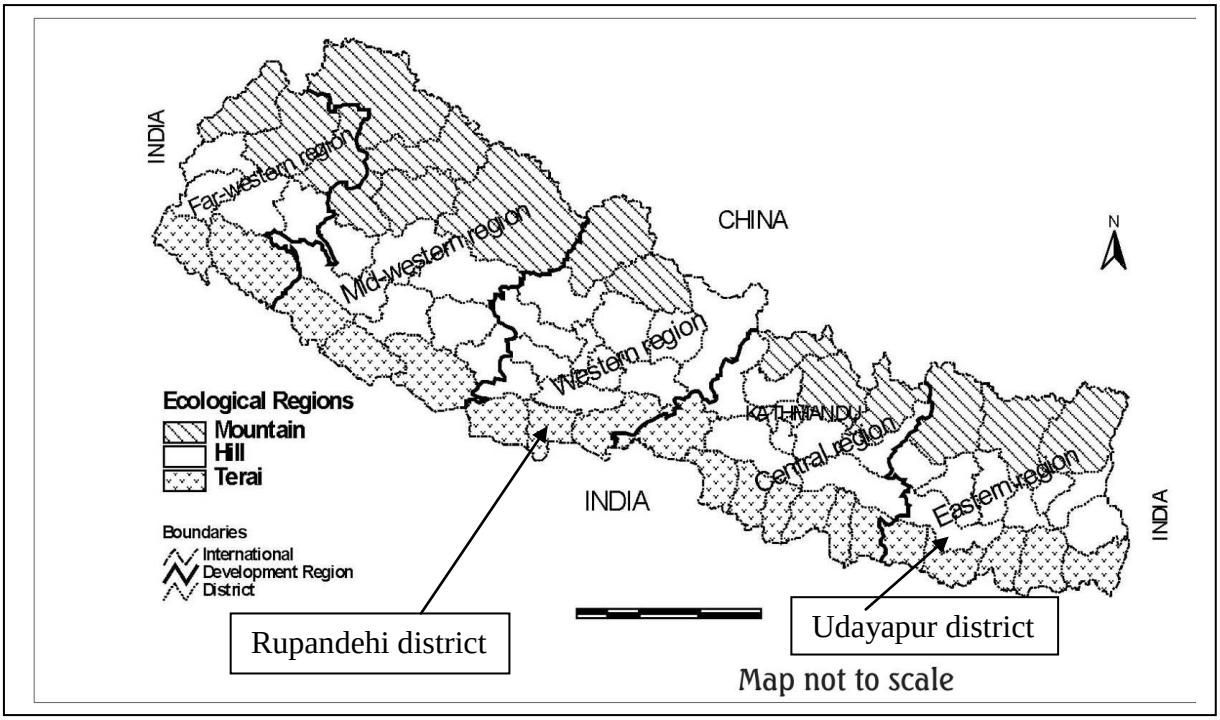


Figure 1.1 Physiographic regions of Nepal.
(Source: National Agriculture Research Centre)

The Terai and Inner-Terai regions are elevated up to 1200 metres (m) from 70 m altitude above sea level and stretches from east to west (Figure 1.1). Out of the national total forest

area of 5.8 million hectares (ha), these regions are covered with 24% forest (1.4 million ha). Sal is the dominant forest type in these regions (FAO, 2008). These two regions cover 30.2 percent of the total land area (14.718 million ha) (Pokharel & Amatya, 2000).

The Hill region is elevated from 1200 m up to 3000 m above sea level (Figure 1.1). This region consists of sub-tropical forests such as *Pinus roxburghi, Schima wallichi, Alnus nepalensis* (FAO, 2008). Thirty three percent of this region is covered by forest. The Mountain region is elevated above 3000 m above sea level. The main forest type of this region is *Rhododendron spp,* which has low commercial value. Finally, the Himalaya region is covered by snow throughout the whole year.

Politically, Nepal is divided into five development regions (Eastern, Central, Western, Mid-Western, and Far-Western), 14 zones and 75 districts (Figure 1.1). Although 20 districts are shown in the Terai region, three districts (Chitwan, Nawalparasi and Dang) actually lie in the Inner-Terai region. As a result, the Terai region consists of 17 districts and the Inner-Terai region consists of 7 districts (Pokharel and Amatya 2000). The Terai is a flat plain, but the Inner-Terai region extends to small hills, dunes and valleys.

1.2.2 Institutional set up of CFUG

Based on the MPFS 1989 and Forest Act 1993, a CFUG is an autonomous and perpetual organisation (Acharya, 2005; Agrawal & Ostrom, 2001; Chakraborty, 2001; Grosen, 2000). Grosen (2000) argues that CFUGs, like any business firm, can grow trees, and harvest, process and sell timber in Nepal without any restriction. The Forest Act 1993 has put a ban on exporting timber however. The institutional set up of a CFUG is illustrated in the Figure 1.2.

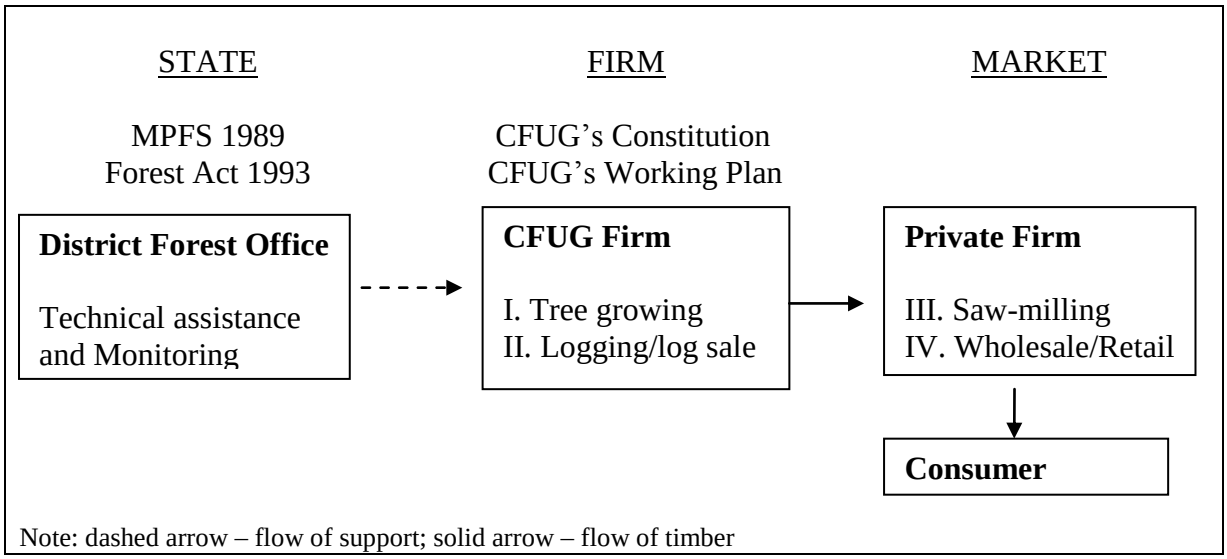


Figure 1.2 Institutional set up of a CFUG for timber production in Nepal.

A CFUG can take the management responsibility for a nearby public forest in a condition of sustainable management. Legally, land ownership of the forest remains with the state. However, the stock and flow ownership remains with the CFUG. The CFUG manages the stock and harvests the flow on a sustainable basis guided by the working plan (WP) – a mutually agreed management plan of the forest by the District Forest Officer and the Chairperson of the CFUG Committee. In addition to the WP, a CFUG must have a constitution to manage the day-to-day activities of the group.

As shown in Figure 1.2, the District Forest Office (DFO) as a state representative has two important roles – providing technical assistance related to forest management, and monitoring the WP in the case of community forest management. A CFUG, like any firm, grows and manages trees along with the other non-timber forest products (NTFP) such as fodder, herbs, and bamboo. Normally, a CFUG harvests logs annually. They sell logs internally to their own members, as well as to private firms. The private firms usually perform sawmilling and wholesaling/retailing. As most of the demand for Sal timber comes from Kathmandu and from regional towns, these private firms are based in these cities and towns (Mitchell, Bajracharya, & Baral, 2001).

1.3 Research Issues and research hypotheses

The prime research issue is that the economic benefit of Sal forests under community management has not been realised, despite having a relatively large number of CFUGs, a strong institutional set up and several comparative advantages in the Terai and Inner-Terai regions of Nepal. An internal report from the Department of Forests (2008) shows no mention of timber produced from community forests. Likewise, Oli (2003) reported that there was only a small amount of timber sold to the market from community forests in the Chitwan district, despite there being a relatively good share of timber production there.

Several opinions have been expressed in the past about the low production of timber for the market from community forests (Bampton & Cammaert, 2006; Kanel, 2006; Oli, 2003; Timsina, 2007). The first reason might be that the forests are too small to organise for harvest and market sale, profitably. For example, the average size of a community forest is only 75 ha per CFUG according to Kanel and Dahal (2008). In order to be profitable, economies of scale are very important (Pratten, 1971; Timsina, 2007). Sakurai *et al*. (2004) found lower protection and security costs in community and private forests but higher silviculture costs in community forests. The minimum efficient scale of timber harvest is, however, not known. From this research issue, the following first research hypothesis can be drawn:

H1: The size of community forests is too small to harvest profitably.

The second research issue might be the internal management or operational problems in arranging harvest and market sales, either in log or in sawn wood form. Oli (2003) argued that the wood product market in Nepal is very inefficient because of the low stumpage value and the high transaction costs. The reasons for this, he pointed out are, an unsatisfactory governmental regulatory role, and a complicated auction process and policy uncertainty. His study has been conducted mainly in the timber market managed by the Timber Corporation of Nepal, who source timber from public forests. However, timber business studies from community forests are rare (Oli, 2003). Further, timber production focussed study from community forests is non-existent (Bampton & Cammaert, 2006; Oli, 2003). From this research issue, the following second research hypothesis can be drawn:

H2: The organisational capacity of a CFUG is weak for timber production and market sales.

The third research issue might be the external or institutional barriers for contracting and cooperative arrangements for vertical integration. The contracting and cooperative arrangements are very important, especially for small producers to gain economies of scale for harvesting, transportation, processing and retailing (Dhungana & Dahal, 2004; Nair, 2007; Timsina, 2007). From this research issue, the following third research hypothesis can be drawn:

H3: There are institutional barriers for contracting and cooperative arrangements in CFUGs that limit vertical integration with the markets.

However, these hypotheses have not been tested and the reasons for limited timber production from the community forests of the Terai and Inner-Terai regions are not known because studies have not been conducted in the past.

1.4 Objectives of Research

From the background discussion, CFUGs in principle are strong local institutions and they can grow trees, manage forests, harvest, process and sell timber like a business firm. The main purpose of this study is to determine whether a CFUG can operate as a forestry business. Thus, the purpose of this study is to investigate the business performance of CFUGs in the Terai and Inner-Terai regions of Nepal. To meet this research purpose, this study has the following three specific research objectives:

1. To investigate whether there are economies of scale in logging in community forests so that the logging operation is profitable to pursue;
2. To examine the organisational capacity or internal management of a CFUG for timber production, processing and market sales; and
3. To determine those institutional barriers for contracting and cooperative arrangements for vertical integration with the market.

1.5 Methods of achieving the specific objectives

Both quantitative and qualitative data are collected and analysed to achieve the three specific research objectives. Data are collected from both secondary and primary sources. In addition, field visits and informal interactions are made to increase the validity of the data by using the triangulation method of verification.

To achieve the first specific research objective, the economies of scale in logging is estimated by using the production economics theory. For this, quantitative output and input data related to timber production are collected from the community forests for the years 2006/07, 2005/06, and 2004/05. These data are analysed by using the ordinary least square (OLS) method of regression.

The second specific research objective is achieved by applying the qualitative method of data collection and data analysis. For this, key respondents from CFUGs, government organisations, private firms, and non-governmental organisations (NGO) are interviewed. The personal interviews are analysed qualitatively by using NVivo computer software.

The third specific research objective is achieved by collecting and analysing qualitative in-depth data about institutional barriers for contracting and cooperative arrangements, from the same key respondents as for the second specific research objective.

1.6 Contribution of the Research

This study is expected to increase understanding on timber production efficiency, organisational ability of CFUGs in arranging logging, processing and market sales, and institutional barriers for vertical integration with the market in community forests of Nepal. Second, this study is anticipated to help CFUGs, government agencies, private firms to increase the production of timber and/or reduce the cost of timber production from community forests. Third, findings from this study might be applicable in other common

property resource (CPR) fields such as fisheries, forest grazing, and irrigation and watershed management, especially where similar institutional set-ups exist. Since the seminal paper of Garrette Hardin (1968) on "The Tragedy of the Commons", literature on CPRs and collective action has been evolving dramatically (Agrawal, 2001; Charles, 1992; Dolsak & Ostrom, 2003; Ostrom, 1990; Pomeroy, Katon, & Harkes, 2001). Dolsak and Ostrom (2003) argue that the importance of the collective action of the CPR is even increasing in the twenty first century, because of the growing number of users and new areas of CPRs such as the internet and the air space. Finally, finding of this study is expected to contribute to the literatures of small scale forestry commons especially from the perspective of business performance.

1.7 Structure and Approach of Research

The thesis is organised in nine chapters. Chapter 1 introduces the issue of timber production and market sales in community forests in Nepal leading to the three specific research objectives of this study. Chapter 2 reviews literature related to timber production efficiency, organisational capacity, and institutional barriers for contracting and cooperative arrangements in arranging the harvest, and also with vertical integration with the markets. The aim of this Chapter is also to synthesise conceptual models based on the literature review. Chapter 3 deals with the materials and methods that have been employed to test the conceptual models of this study. Chapter 4 explains and compares descriptive statistics of the study area and the sample. Chapter 5 presents results related to the timber production efficiency. Chapter 6 displays the results related to the organisational capacity of CFUGs in organising harvesting, processing, and market sales. Chapter 7 reveals the results related to the institutional barriers for contracting and cooperative arrangements. Chapter 8 discusses the findings of Chapter 5, Chapter 6 and Chapter 7. Finally, Chapter 9 draws the conclusions as well as implications of this study.

Chapter 2
Literature Review and Theoretical Framework

2.1 Introduction

The previous chapter introduced the research background of timber production and market sales from CFUGs in the Terai region of Nepal. This chapter reviews literature relevant to the research objectives, which are about the economies of scale for logging, the organisational capacity of a CFUG in arranging logging and market sales, and institutional barriers for contracting and cooperatives. The purposes of this chapter are: (A) to find out research gaps; (B) to synthesise a theoretical model to fulfil the aims of the research objectives; and (C) to determine the materials and the method of studying the model.

There have been significant developments in understanding and theorising about common property resource (CPR) management along with the evolution of collective action, after Garret Hardin's seminal paper "The Tragedy of the Commons" in 1968 (Basurto & Ostrom, 2010; Berkes, 2010). CPR management is widely used in forestry, fisheries, grazing land, irrigation, protected areas and ground water. Community or collaborative or joint forestry are simultaneously used terms in CPR forestry. Community forestry is being practiced around the world (J. Carter, 2010).

However, studies related to commercialisation and production efficiency of CPR management are rare. Timber and other forest products appropriated from community forests are mainly used internally for subsistence. The production efficiency study can be done applying simple microeconomics production and cost function models. How a CFUG makes decision to produce timber for market sales depends on its organisational capacity and its institutional set up of vertical integration with the market. To study these aspects, the theory of a firm might be helpful rather than simply using production and cost functions.

The concept of a firm has been developed from the seminal paper of Ronal Coase entitled "Nature of the Firm" in 1937 (Coase, 1998). A firm's governance decision of 'make' or 'buy' or 'contracting' depends on the institutional factors, especially property rights over resources and the transaction costs of doing business (Williamson, 1985, 1998). There are several studies on private and state firms regarding their decisions on governance structure. However, such studies in CPR user groups' organisations are rare. The study of community forestry enterprises in Mexico is probably the first extensive study of a social firm (Antinori, 2000;

Antinori & Bray, 2005). The community forestry groups lie somewhere in the middle of the continuum between a private firm and a state firm (Antinori & Bray, 2005; Zhang, 2001). Additionally, it is not known what factors of organisational capacity affect the ability of CFUGs to achieve timber production and market sales in Nepal and in many developing countries where community forestry is being practised extensively.

Likewise, cooperatives of smallholder farmers are common in agriculture (Brennman, 2004; Staal, Delgado, & Nicholson, 1997). Smallholder farmers' cooperatives are helpful in reducing the transaction costs of business by either vertically integrating on their own or integrating with market agents through contracting. However, such cooperative studies are rare in smallholder forestry and community forestry.

Literature review is organised covering all these topics briefly discussed above namely, common property resources and collective action (Section 2.2), community forest user groups and the theory of a firm (Section 2.3), new institutional economics and transaction costs (Section 2.4), production analysis of timber (Section 2.5), characteristics of a successful firm (Section 2.6), and expanding beyond a CFUG (Section 2.7). Then, based on the literature review, theoretical frameworks of a CFUG as a social firm (Section 2.8) are synthesised for production analysis, the organisational capacity of a CFUG, and institutional barriers for contracting and cooperative. Finally, a chapter summary is given (Section 2.9).

2.2 Common property resource and collective action

Many important resources such as forests, fisheries, grazing land and irrigation etc, are common in nature to many people, usually called users. Therefore, the availability of these resources directly affects the livelihood of the users. Only the collective action of the users can guarantee the sustainable management and resource appropriation (Ostrom, 1990). The absence of collective action in the CPR leads to Hardin's "The Tragedy of the Commons". Dolsak and Ostrom (2003) further argue that the importance of the CPR and collective actions has been further increased in the twenty first century, because of the dramatically increasing use of the internet, and the trans-boundary aspect of air, which are new CPRs.

Despite the burgeoning amount of literature on CPR management, problems of CPR management are often complex and exist at different levels. For example, many scholars argue that there are always tensions between resource users and the state over resource use and control (Berkes, 1986; Ostrom, 1990; Pomeroy & Berkes, 1997). In addition to the resource users and the state, Charles (1992) and Yandle & Dewees (2003) argued that the economy or market is the third stake, a new paradigm shift, in CPR management. The basic

sources of tension in CPR management are the resource conservation, community welfare, and the economic rational preferences of the state, the community and the market respectively. For example, the state's priority is often on the conservation of resources, whereas the users' and the market's priorities are on community welfare and economic benefit respectively. These tensions can be called stakeholder level tensions. In addition to the stakeholder level tension, there is always internal tension among users (Agrawal, 2001; Charles, 1992; Dolsak & Ostrom, 2003; Ostrom, 1990).

Scholars on CPR management argue that there is no easy standard prescription, to overcome the above tensions (Agrawal, 2001; Charles, 1992; Dolsak & Ostrom, 2003; Ostrom, 1990). These scholars agree on capacity building of users, based on clear principles for long term solutions for CPR management. Ostrom (1990) pointed out eight design principles of long-enduring CPR institutions. These principles are: 1) clearly defined boundaries; 2) congruence between appropriation and provision rules and local conditions; 3) collective-choice arrangement; 4) monitoring; 5) graduated sanctions; 6) conflict-resolution mechanisms; 7) minimal recognition of rights to organise; and 8) nested enterprise, in the case of CPRs that are parts of larger systems.

Likewise, Dolsak and Ostrom (2003) and Pomeroy et al. (2001) argue that the resource users' institutional capacity has to be developed with the back up support of the state for the sustainable and effective management of CPRs. Dolsak and Ostrom (2003) argue that along with the resource characteristics, the characteristics of users in the form of groups as well as individuals, are important factors to consider when designing CPR institutions and resource use. Further, they explained that the economic/political/legal factors and technology, directly or indirectly affect CPR institutions and resource use. Thus, the political environment, legal environment, and technology level, impact on CPR institutions and resource use.

Similarly, Pomeroy et al. (2001) identified that there were 18 favourable conditions or factors for the success of fisheries management in Asia. These factors were grouped into three levels: supra-community level; community level; and individual level. In the supra-community level, enabling policy and legislation, and enabling the existence of external agents, were two important factors. These factors are similar to the political and legal environments referred to by Dolsak and Ostrom (2003). At the community level, there were 15 important factors that were similar to the resource and user group's characteristics referred to by Dolsak and Ostrom (2003). The important community level factors were; appropriate scale and boundaries, empowerment and capacity building, leadership, and property rights over resources etc. And at the individual level, incentive structure was an important factor.

Although these studies were done mainly in fisheries, their inferences are relevant for studying the organisational capacity for timber production and market sales, and the institutional set up for contracting and cooperative arrangements of CFUGs in Nepal. The organisational capacity-related factors and institutional arrangements that enabled contracting and cooperatives in fisheries communities, may help to find out the determining factors of the organisational capacities of a CFUG and institutional barriers for timber production and market sales, from community forests in Nepal.

2.3 Community forestry user group and theory of a firm

Ronald Coase pointed out that a firm exists in the market place because market prices of input resources only cannot reflect the total cost of a product (Coase, 1937). The total cost of a product is the cost of input resources as well as the other costs of researching information, making negotiations with resource suppliers and enforcing negotiations etc. These costs are the basis of the theory of the firm.

There are several views on the theory of a firm. Tirole (2002) mentioned three theories of a firm. The first is, the need for technological construct to gain economies of scale and scope. The second is long term contracting as per the Williamson theory. A firm is more than a production function – a technological construct in simple microeconomics (Williamson, 1998). The third is an incomplete contract view. The second and third are similar views except that the latter is more practical and is closer to legal definitions of a firm. Because of the incomplete nature of contracting, transaction costs of business exist (Williamson, 1985, 1998). Williamson (1985) argued that the firm is a hierarchy of managers and workers who engage in the production of goods and services to reduce the transaction costs, compared with the cost of buying from the market and contracting out. A slightly different view, Alchian and Demsetz (1972) argued that a classical firm is a contractual structure for team production among owners-employers with the input of the owners-employees. Alchian and Demsetz (1972) disagree with the Williamson (1985) hierarchical or authoritarian role of owner-employer, but argued for a continuous renegotiation of the contractual structure of owners-employees.

The agency theory of the firm is based on the premise that agents or managers are experts and are therefore hired and given management responsibility through a complex set of contracts (Jensen & Meckling, 1976). Investors are happy to bear the management risk of managers as well as agency costs. Modern business corporations are examples of firms based on the

agency cost. In corporations, ownership is retained by the investors. However, the management responsibility is given to the managers.

These theories are applicable in all types of firms ranging from profit making to non-profit making, from agricultural cooperatives to business corporations, from social firms to a franchised football club (Alchian & Demsetz, 1972). These firms may range from a purely public bureau, to a purely private firm (Williamson, 1998), or to community forestry as a social firm (Antinori & Bray, 2005; Zhang, 2001).

Williamson (1975) in Antinori (2005) reported that the extensive theories of firms and institutional economics are fundamentally, a study of collective action in which ownership and residual decision making of resources are defined, and economic individuals act collectively in their assigned role. Antinori (2005) compared the ownership and control of a community forestry enterprise (CFE) in Mexico with conventional firms and many other firms such as Non-Industrial Private Forests (NIPFs) of the USA and Industrial and Agricultural Cooperatives. She argues that the CFEs and CPR enterprises are a new area in the theory of firms. She showed that CFEs have some similarities and differences with conventional firms and cooperative firms, in terms of ownership, decision management, decision control, legal systems and objectives. For example, ownership of stock and flow of CFEs remains with the members of the community – similar to the NIPFs and conventional firms, but decision management and control are done by the general assembly, which is different. Also, CFEs have multiple objectives in addition to profit making – similar to the agriculture cooperative.

The comparison of CFEs in Mexico as a social firm with other conventional and cooperative firms, is very relevant to understanding the institutional set up of CFUGs in Nepal, and to study the timber production and market sale. The CFUGs are similar to the CFEs in decision management and control, the legal system and in objectives. However, the CFUGs may be different to the CFEs in terms of ownership, as the land ownership of community forests remains with the government (Forest Act, 1993), and CFUGs' ownership of stock and flow are questionable (Bampton & Cammaert, 2006; Bhattarai et al., 2002).

Many scholars agree that CFUGs are a driving force for the management of community forests (Acharya, 2005; Agrawal & Ostrom, 2001; Chakraborty, 2001; Hobley, 1996). One of the main reasons for this driving force is the strong local institutional set up of CFUGs, often based on the indigenous management system of Nepal, and backed by the government's legislation. Chakraborty (2001), Acharya (2005), and Bampton & Cammaert (2006) argue

that CFUGs in Terai as well as in the Hills and Mountains, have the institutional ability to manage forests and take economic rent from the high value Sal forests. In contrast, a few scholars doubt the institutional ability of CFUGs in the Terai, because of the different socio-political and geographical settings, and also the government's policy, compared to the Hills and Mountains (Bhattarai et al., 2002; Gautam, Shivakoti, & Webb, 2004b). However, there is no scientific proof that the institutional ability of CFUGs in Terai is inferior or that it cannot manage valuable Sal forest.

Ostrom (1996) developed the word "co-production" to explain the potential partnership for synergistic production and development between the "regular producer" (generally government officials) and the "clients" (generally citizen-users). This is a new perspective which challenges the conventional divisible thinking of service provider and service recipient. She illustrated examples of co-production in systems like education, police, health and infrastructure development. This is similar to the "co-management" of natural resources like fisheries and forestry, and team production referred to by Alchian and Demsetz (1972) where two parties are somehow assumed to be team members. The key feature of co-production is the existence of non-substitutable but complementary inputs from two parties.

However, I argue that the institutional arrangement of a CFUG is different from the co-production, but similar to an independent social firm like the CFEs in Mexico. There are two reasons for this argument. First, the CFUG is the owner/manager of the forest stock and flow. A CFUG is an autonomous and independent institution which can make decisions for timber production and other forest management matters as well as members' welfare and related activities based on the Forest Act 1993 of Nepal. Second, government inputs can be substituted by non-government organisations' inputs.

Despite there being some doubt about the institutional abilities of the CFUGs in the Terai region, there is high potential for making an economic benefit from sustainable management of the high value Sal forest. This region has also some other comparative advantages such as fertile land, relatively easy access by road and a local market. Bamton and Cammaert (2006) argue that the CFUGs of the Terai region have the potential for making an economic benefit from the high value Sal forest. Therefore, although some doubts have been cast by some community forestry scholars of Nepal, a CFUG of the Terai region has many similarities to the CFEs in Mexico and can be considered a social firm.

2.4 New Institutional and Transaction Cost Economics

Coase (1998) explained new institutional economics (NIE) as the new perspective of economics, in which institutional factors of a society or a country, such as its legal system, its political system and its social system, affect the productivity of an economic system. The transaction cost (TC) is the cost of doing business (Williamson, 1985) which depends on the institutional factors of a country or an economic system. Thus, the NIE and the transaction cost economics (TCE) are interrelated. Reviewing both the NIE and the TCE is important because as a social firm, a CFUG's timber production and market sales are affected by the institutional factors and transaction costs.

The term NIE was coined by Oliver Williamson in 1975 (Coase, 1998). To understand NIE, it is important to understand the term "institution". North (1990) defines institution as a humanly set up compulsion or organisation which delineates the structure of political, social and economic interaction. Institutions are essential in order to make predictable human interactions in a society.

Williamson (1998) has elaborated on and illustrated the concept of economics of institutions in four levels (Figure 2.1). From the economics rational point of view, he argues that as a society advances, it tries to reach Level 4 from Level 1. Level 1 is all about the social embeddedness of a society because of common culture, customs and rites. These are informal rules of society which emerge over 100 – 1000 years.

	Level	Frequency (Year)	Purpose
1	Embededness: informal institution	100 - 1000	Often non-calculative: spontaneous
2	Institutional environment: Formal rules of the game – especially property right	10 - 100	Get the institutional environment right
3	Governance: Play of the game – especially contracting	1 - 10	Get the governance right
4	Resource allocation and employment	Continuous	Get the marginal condition right

Figure 2.1 Economics of institutions (Williamson 1998).

Level 1 leads to Level 2. Since informal rule alone is not enough to guide human interactions, a society needs formal rules (Level 2). A nation's constitution, laws, regulations and policies are examples of formal rules. All these rules are also referred to as "rules of the game". Among these rules, rules of property rights of resources, is the one of the most important rules. Williamson (1998) referred to this process of getting the institutional environment right as "first-order economising" and may take 10 to 100 years. Further, North (1987) argues that the economic institution as the main driving factor for economic growth, can realise gain from specialisation and division of labour. The specialisation and division of labour can only be possible if property rights of resources are stable and guaranteed by the political and judicial institutions.

Based on Level 2, the governance of an institution (Level 3) is set up. Level 3 is also referred to as the "play of the game" (Williamson, 1998). The play of the game refers to transactions performed through the market, contracting, the firm, public bureau, whichever is the cheapest to a business organisation. The purpose of Level 3 is to get the governance right, "second order economising" in the words of Williamson (1998), and can take from 1 to 10 years time frame to get this right (Figure 2.1).

Finally, based on the governance structure of an institution Level 4, with resource allocation and employment, is set. At this level, a firm or business organisation attempts to find the right production function or economies of scale, and the scope to exhaust the resource for economic profit. The purpose of this Level is to get the marginal conditions right and this is a continuous process.

Williamson (1998) argues that the transaction cost economics (TCE) operates at Level 3, (Figure 2.1). The basic premise of the TC is that a firm can not get input resources cost-free because of the continuous searching, negotiating, implementing and enforcing parties in the market place. Therefore, contracting is unavoidably incomplete because of the bounded rationality and opportunism of human nature (Williamson, 1973, 1998). In a similar line, North (2000) termed production as the process of transforming and transacting. The latter is the process of defining, protecting and enforcing property rights.

Both economists have argued that the institutional set up has an impact on the economic performance of a society. In order to achieve the right marginal conditions (Level 4), the initial levels of an institution had to be right and conducive. For example, if the property right is not clear or not conducive (Level 2 in Figure 2.1), then potential parties will not make contracts in order to accumulate resources in the production system.

Although the NIE framework has been developed in the context of an industrial society and at a societal level, the framework is still applicable in a developing society and at the level of a firm such as a CFUG. How the NIE framework is applicable to studying the production of timber, and institutional barriers in CFUGs will be discussed below.

2.5 Production analysis of timber

As stated in Chapter 1 there might be the issue of scale logging in community forests because of the small forest size and thus the small amount of production and resulting difficulty, in arranging logging and market sales. Sutton (1973) argued that the forest size and the scale of operation were important to become an efficient firm and gain economies of scale. In this section, previous studies on production efficiency will be reviewed.

Farrell (1957) first developed a comprehensive conceptual model for the measurement of productive efficiency of an industry, by taking into account all input factors. He argued that prior to his conceptual model there was only partial consideration of inputs. For example, labour productivity alone in an industry, used to be considered as the measure of productive efficiency.

Production efficiency can be studied in different functions such as production, costs, revenue and profit because of their close relationship (Coelli, Rao, O'Donnell, & Battese, 2005; Siry, Cubbage, & Sills, 2003). Production function is the maximum possible output from a given set of inputs, whereas the cost function is the cheapest possible way of production of outputs from a given set of inputs under a certain technology. So the study of production efficiency is the technical efficiency of firms and the cost function is the allocative efficiency. The production function and cost function are exactly the inverse to one another and are therefore called dual.

Coelli et al., (2005) reported that production efficiency can be examined by four methods: ordinary least square (OLS) econometric production models; total factor productivity (TFP) indices; data envelop analysis (DEA); and stochastic frontier analysis (SFA). They also argued that the former two methods were most commonly used for aggregate time-series data and were appropriate to use to measure the performance of technical change. These methods assume all firms are technically efficient. Compared to these, the DEA and SFA methods are most commonly used for cross-sectional data. These methods consider each firm to be technically inefficient. The OLS and SFA methods are parametric methods, whereas the TFP and the DEA methods are non-parametric.

Despite the prolific growth in production efficiency studies in other sectors, forestry production analyses are relatively few (D. R. Carter & Siry, 2003). These studies are conducted in private and government forests (Fenton, 1970; Kao, Chang, & Hwang, 1993; Newman & Wear, 1993; Siry & Newman, 2001; Sutton, 1973). In the case of community forestry, production efficiency studies are rare (Antinori & Bray, 2005; Misra & Kant, 2004).

The common functional forms of the OLS method for estimating production, costs and profit functions are: linear; Cobb-Douglas; quadratic; normalised quadratic; translog; generalised Leontief; and constant elasticity of substitution (Coelli et al., 2005). Cobb-Douglas and translog functional forms are commonly used in studies of forestry production efficiency (Cubbage, Wojtkowski, & Bullard, 1989).

Timber production is the function of: forest area or tract size; stand volume; tree size; equipment configuration; capital; labour and input prices; and road accessibility (D. R. Carter & Siry, 2003; Siry et al., 2003; Siry & Newman, 2001; Sutton, 1969). Generally, productivity of logging is higher in well stocked, large area, accessible forests, with the application of machines and skilled labour because the increase in production size reduces the unit cost of production to a certain level.

Carter & Cubbage (1994) studied productivity and costs, of a range of systems from labour intensive to mechanised harvesting, in the Southern United States pulpwood harvesting industry, applying the Cobb-Douglas functional form. They found that there was a reduction in the average costs of harvesting from years 1879 to 1987 and from a labour intensive system to a more mechanised system. Stuart, Grace & Gala (2010) examined productivity of logging contractors in the Eastern US logging industry, using the Cobb-Douglas functional form. They found that a decreasing returns to scale in the logging industry.

Cubbage, Wojtkowski, & Bullard, (1989) explained the determination process for cost functions for forestry logging operations in the southern US pulpwood industry. They examined four types of functional form (linear, quadratic, cubic, and exponential) and found that the exponential function, which was the inverse of the Cobb-Douglas production functions, was the best for estimating the cost relationship, in observed empirical data. They estimated the weekly total cost function of each firm using labour, capital, and fixed cost inputs. Then, they derived the average cost – by dividing total costs by output.

Nanang & Ghebremichael (2006) found that all three Canadian provinces, British Columbia, Ontario and Quebec had increasing return to increasing scale in logging, implying that the industry could save production costs by increasing the production size. They used the translog

cost functional form for log production as an output of labour, capital, energy and material inputs. Bauch, Amacher & Merry (2007) estimated the cost functions of logging, transportation and milling in the Brazilian Amazon using the Cobb-Douglas and the translog functional forms. They found increasing returns to increasing scale in the logging and transportation industry. This means that the average costs of logging and transportation could be reduced if economies of scale were to be captured by the industry.

Siry & Newman (2001) examined the economies of scale and technical efficiency of timber production in the Polish forestry sector using the stochastic frontier analysis (SFA) model. They found that the Polish districts had increasing returns to increasing scale production function in the presence of substantial technical inefficiency. They examined timber production in 40 Polish districts, as sole output (Y) and function of input vectors (Xs), such as forest area, growing stock, permanent and temporary forest workers, administrative employees, distance to the road, personal vehicles, logging trucks and tractors, and a share of the privatisation costs used. They used three years panel data from 1993 to 1995.

The use of the DEA approach to study productivity in the forestry sector is increasing (Siry et al., 2003). The DEA approach does not consider a production frontier defined by a technology. Rather it assumes maximum output from inputs used by at least some firms based on the same technology (Coelli et al., 2005; Kao et al., 1993; Pascoe & Tngley, 2007). Kao *et al.*, (1993) applied to measure the efficiency of forest management in 17 district forests in Taiwan. They selected budget, initial stocking, labour and land as inputs, and timber production, average stocking, recreation and by-products as outputs. They estimated technical efficiency, scale efficiency and aggregate efficiency as the measure of efficiency of forest management and found similar results from the piecewise linear and the piecewise log-linear model.

In all of these studies the common input factors of timber production were land (forest area), labour, capital (growing stock, capital and machines), energy, and accessibility. Common methods of examining productivity in terms of scale and technical efficiencies were the OLS and the SFA. The Cobb-Douglas and the translog cost functional forms were common approaches to studying these issues. Production function is used to estimate, in the case of endogenously determined output levels, whereas cost function is used to estimate, in the case of exogenous output levels (Christensen & Greene, 1976).

All of these studies have been carried out in industrial forests and in relatively large forests. Such productivity studies in community forests, is either nonexistent or rare. Misra & Kant

(2004) proposed a framework for the production analysis of community forests, using an example of joint forest management (JFM) from the Gujarat State of India. Their framework considers the local JFM group as a social organisation, and the economic output of a joint forest management group depends on the biological output (canopy cover of the forest) and the social output (social empowerment). This study used both conventional input factors (land, labour and capital) and non-conventional input factors (social, cultural and organisational). However, this study has little relevance to the study of scale issues of timber production in community forests because it did not focus on timber production, but rather, considered the economic output to all forest products supplied to JFM members.

As mentioned above, most of these studies have been carried out in commercial forests – large scale forests. Study of small scale forestry is rare (Antinori & Bray, 2005; Bampton & Cammaert, 2006; Misra & Kant, 2004). The production of Sal timber and the organising of market sales from CFs in Nepal can even be considered to be micro-scale forest operations. However, investigating the scale effect of harvesting in community forests should be similar to large scale industrial forestry as Stewart (1958) argued that the economics of farm management was fundamentally the same as the economics of an individual, and of an industry, and of a State.

Thus, the size of community forests, growing stock, labour, machines, and road access have a high potential for affecting timber production from community forests. To investigate the scale effects of timber harvesting, the OLS method with the specification of the Cobb-Douglas production function and translog cost function, are commonly used in literature.

2.6 Characteristics of a successful social firm

This section of literature review is focussed on the important characteristics of social firms in forestry and fisheries, which contribute to developing a successful organisation and remaining in business. As synthesized by Dolsak and Ostrom (2003) discussed above, the characteristics of a collective organisation and of individuals are important. Further, they argued that the characteristics of a collective organisation depend on economic, political, and legal environments, and technology, and attributes of common resources, directly or indirectly. This argument is similar to North's (2000) institution – an institution focuses mainly on defining the property rights of resources with formal rules (polity, law and jury). Based on the characteristics of a firm and business, the environmental transaction cost is determined (North, 1990; Williamson, 1998).

To become a successful social firm, the most important characteristic appears to be the quantity and quality of common property resources. Antinori and Bray (2005) found that CFEs in Mexico with little or no commercial value forest, had little or no importance for production of timber and doing business. Likewise, Torres-Rojo, Guevara-Sangines, and Bray (2005) also argued that one of the main reasons for success in national and international markets by CFEs in El Balcon, was the excellent forest stock with a relatively large size forest area.

In addition to the characteristic of common property resources, other important characteristics appear to be social capital, human resources, physical capital, and financial capital (Antinori & Bray, 2005; Dolsak & Ostrom, 2003; Torres-Rojo et al., 2005). Antinori & Bray (2005) argued that the common property institutions in Mexico have a long history and tradition as a strong form of social capital. They also found that the mechanical skills and experience in the federal concessions were strong predictors of timber production of CFEs. As well, CFEs' access to banks for financial assistance was found to be very important for becoming a successful social firm (Antinori, 2005; Torres-Rojo et al., 2005).

Scholars of industrial firms have highlighted the importance of property rights over resources, in order to organise them and bring in production systems (Furubotn & Pejovich, 1972; Hart & Moore, 1990; North, 1990, 1991). The well defined and strong property rights over resources, allows a firm to take economic advantage with specialisation. The importance of property rights over resources is high not only in the industrial firm, but also in the social firm, such as CFEs (Antinori & Bray, 2005) and fisheries (Yandle & Dewees, 2003). Yandle & Dewees (2003) reported that the fisheries industry of New Zealand was one of the leading market based industries because of clearly defined and enforced property rights on fisheries management. Private companies are investing their resources into the fisheries management and market chain. Likewise, Antinori & Bray (2005) and Bray, Antinori & Torres-Rojo (2006) argued that one of the main reasons for the success of CFEs in Mexico was strong and well defined property rights over stock and flow including land ownership. As part of the strong property rights over resources, CFEs were found to be directly controlling logging and revenue.

Further, support from government, non-government organisations and market agents seems to be another important factor for becoming a successful social firm (Antinori & Bray, 2005; Bray et al., 2006; Torres-Rojo et al., 2005; Yandle & Dewees, 2003). CFEs in Mexico were getting strong support from government. Also, they have a strong relationship with local NGOs and market agents, for timber production and market sales. Similarly, supportive

government policy for vertical integration was another key factor for the success of CFEs in Mexico (Antinori & Bray, 2005; Bray et al., 2006).

The above findings are relevant for the community forest user groups of Nepal where the average size of forest is small at only 75 ha per CFUG (Kanel & Dahal, 2008). Comparing this to the success of the CFEs in Mexico, Chakraborty (2001) found that the CFUG in the Terai region of Nepal had traditional and strong leadership in villages, similar to the social capital of the CFEs. He emphasised the benefits of the support of government, especially in forest administration, in enforcing the rules, for a successful long-term CFUG operation.

However, in the case of CFUGs in Nepal, studies on the property rights of CFUGs over community forests, is rare, and even more rare on the timber. Agrawal and Ostrom (2001) conducted a comparative study of four forest management regimes in India and Nepal: forest council in Kumaon in India; joint forestry management in India; a community forestry programme in the Mid-hills; and the parks and people programme in Terai in Nepal. They argued that the delegation of property rights and decentralisation were strongly correlated. The extent of property rights delegation was higher and therefore an effective decentralisation in the first and third management regimes, compared to the second and the fourth regimes. This study has taken the parks and people programme from Terai, which is a different programme compared to community forestry. They explained the property rights in terms of rights to withdrawal of resources, rights to manage, rights to exclude, and rights to transfer. For community forestry in Nepal, they rated the first three rights as granted to local groups, but with some limits and future uncertainty. However, in the case of rights to transfer, they rated limited rights.

Thus, the above literatures show the crucial role of characteristics of an organisation or social firm to participate in the production of timber and market exchange. The organisational capacity in terms of internal resources (such as size and quality of forest resources, social capital, leadership, physical capital and financial capital), property rights over stock and flow, the relationship with government and market agents, and the government policy framework, are important in becoming a successful social firm.

2.7 Expanding beyond a CFUG

As the focus of this study is timber production and market sales, it is important to review literature beyond a CFUG – that is, integration with the market. The purpose of this section is to review the literature on the characteristics of a firm based on which it makes decision of

vertical integration either on its own (Hierarchy) or through contracting (Hybrid) or through the spot market (Market).

2.7.1 Vertical integration

Vertical integration (VI), hierarchy, and firm are often used interchangeably in transaction cost economics literature (Antinori, 2000; Lonnstend, 2003; Williamson, 1985, 1998). However, in this thesis, VI is defined as the production of goods and services, which require the transformation process and delivery to the final customers in a market. In forestry, VI includes tree growing, harvesting, sawmilling (and/or value addition), and retailing. In this thesis, the VI is applied to the last three stages of production because the tree growing is often a natural process in community forests in Nepal. Most of these forests are natural and regenerating or regenerated naturally.

In the case of CFEs in Mexico, Antinori (2005) found that the vertical integration was a combined function of social capital, mechanical experience, and greater resource endowment. Antinori found that the CFEs preferred a vertical integration in order to avoid contracting moral hazard. Moral hazard is a risk of breaching contractual obligations because of bounded rationality and the opportunistic behaviour of humans (Williamson, 1985).

In the case of the fisheries industry in New Zealand, Yandle (2003) found cooperation between large vertically integrated firms (deep water industry) and small firms (inshore industry). The former required modern and large scale catching gear, so are fewer in number but larger in size, and vertically integrated with the processing companies. On the other hand, the inshore industry consisted of a large number of small fishing operators often with borrowed boats from the large operators. These small size fishing operators were found to be selling their catch to the vertically integrated companies.

In a study of the Canadian forest product industries, Globerman & Schwind (1986) found that the vertical integration is a preferred mode of governance structure where there is high asset specificity and high vulnerability. Tapon & Cadsby (1996) studied the issue of how best to organise the research and development (R&D) function in the Canadian pharmaceutical firms. They found that the vertical integration of R&D was still the solution of choice for these firms because the transaction costs of contracting out R&D were high.

These findings imply that for vertical integration by a single firm, the hierarchy mode of governance in term of Williamson (1998), is determined by the size of production and the capacity of a firm. In the real world all firms or organisations are constrained by resources.

Therefore, they try to forge some kind of coordination and cooperation with other market agents or firms. The trade coordination can be done through contracting and cooperative arrangements with small producers.

2.7.2 Contracting

By means of contracting, one firm reduces the costs of production and trade, utilising the other firm's asset specific investment and specialisation (Tirole, 2002). Contracting is generally done for the long term. However, the mutual gain can only be realised with some risks and costs. The risks are hold-up problems and contract breaching *ex post*. The costs are searching for information, drafting contracts, negotiations, and monitoring the contracts. These risks and costs of contracting can be reduced if the frequency (Williamson, 1985) or the number of trade, is high. High frequency of trade also motivates contracting firms to invest in the production system (Tirole, 2002).

Contracting is preferred if the hierarchy has high transaction costs. For example, Lonnstend (2003) found that the Swedish pulp and sawmill industry had contracts (backward integration) with timberlands because of the high transaction costs of growing trees on their own. Without investing in tree growing, the best possible option for securing deliveries of raw materials was contracting. He conducted in-depth interviews with CEOs of three pulp and paper companies and three sawmill companies.

In the case of CFEs in Mexico, Antinori and Bray (2005) argued that the success of CFEs in national and international markets was attributed also to the utilisation of the contracting opportunities of CFEs, with national and international market agents. In the case of the fisheries industry in New Zealand, the success of the industry is credited to the cooperation between small inshore firms with large offshore firms.

However, Brennman, (2004) argues that, especially in developing countries, contracting always has a greater risk of opportunistic behaviour because of poor enforcement. For example, Behera and Engel (2006) argued that the persistence of problems in joint forest management (JFM) in India, was because of breaches of contractual obligations by the government agency. The first breach found was the incomplete and incomprehensible transfer of property rights from the Forest Department to the local communities which caused uncertainty. The second breach was that the Forest Department underestimated the local community. This limited the community people to craft rules related to CPR and enforce these rules in order to appropriate resources. The third breach was when an unreasonable rent-seeking problem was found in the Forest Department officials mainly because of the lack of

information similarity between them and the community leaders. The forth breach was that the local community could not enforce the contracts.

2.7.3 Cooperative

Cooperative arrangements of small producers are common in agriculture (Brennman, 2004; O'Connor, 2003; Staal et al., 1997). O'Connor (2003) argues that cooperatives have played a major role in the agricultural industry in all developed countries and in many developing countries. He mentioned three common objectives, of small farmers, in forming a cooperative – (A) to increase the bargaining power with the market, (B) to utilise the advantages of cooperatives as offered by the government and (C) to tap opportunities to pursue a business.

However, the benefits of cooperative do not come without costs or problems. Brennman (2004) argues that agricultural marketing cooperatives in developing countries have to face several problems: management related problems, capital problems, overseeing management, transaction costs of contracting and negotiation, and institutional barriers such as weak enforcement of contracting rules, weak public infrastructure to support markets, a lack of information symmetry because of low education levels, poor communication, and a poorly functioning market. Because of these problems, vertical integration through cooperatives for small farmers is not always a good option. However, even in the case of no vertical integration, the benefits of bargaining power for cooperative farmers is always there (Brennman, 2004).

Staal et al., (1997) studied smallholder dairying in Kenya and Ethiopia, applying the transaction costs. They found that the transaction costs for dairy production was very high, to asset- and information-poor smallholders. Cooperatives of smallholders were crucial in reducing the transaction costs of participating in the dairying industry.

Aggarwal (2000) studied the possibilities and limitations for cooperation in village well groups in Andhra Pradesh in India. She found good cooperation levels in the case of those activities which were repetitive in nature (frequency), required low contributions, entailed low risks, and required close monitoring. In contrast, she found limitations on cooperation in the case of joint investment because of the lack of long term commitment, poorly defined rules, costly enforcement, a low success record and low timely payments made by members.

Antinori (2000) observed that cooperative arrangements for joint production and vertical integration were not preferred by the small size community forests in Mexico. She indicated

that the preference for autonomy, and the bargaining costs of cooperative arrangements, were potential reasons for this.

In the case of CFUGs in Nepal, cooperatives are rare (Timsina, 2007). For the timber business, only five community forests in Nepal created one CFUG cooperative out of more than 14,000 CFUGs. The Chaubas-Bhumlu Cooperative is a trial project that is organising the logging, sawmilling and retailing of timber in five community forests with the support of the DFO and the International Donor Organisation (Timsina, 2007). For non-timber businesses, there are a few examples of CFUG cooperatives such as Bel fruit juice (Paudel, 2007). These researchers argued that inconsistency in government policy, controlling the role of the DFO, and a long bureaucratic hurdle of transportation difficulties, and forest product sales' difficulties, were constraints of vertical integration through cooperatives.

2.7.4 Summary

Thus, vertical integration with markets can be done through hierarchy, or contracting, or cooperative arrangements. A firms' governance structure decision to integrate vertically, depends on the organisational capacity of that firm and the transaction costs of business. A firm prefers hierarchy, to avoid the potential risk and cost of contracting and cooperative arrangements. However, hierarchy is difficult to achieve for many firms because of economies of scale problem. Compared to the hierarchy, contracting and cooperatives are better options for small firms. Contracting and cooperative arrangements also depend on the existence of contracting law and enforcement mechanisms, asset specificity, frequency of production and trade, and support of government and other organisations.

2.8 CFUG as a social firm – a business approach

Based on the literature review, a business approach of a CFUG as a social firm for timber production and market sales, is drawn. A business approach includes economies of scale for logging, the organisational capacity for arranging logging, processing and market sales, and the institutional set up for vertical integration with the market. These business approaches are designed according to the three research objectives that were posed in Chapter 1. The business approach to study timber production efficiency, organisational capacity and institutional barriers for market sales from community forests are organised into three subsections: timber production efficiency (2.8.1), the organisational capacity of a CFUG (2.8.2), and barriers for contracting and cooperatives (2.8.3).

2.8.1 Timber production efficiency

As guided by the literature, simple production and cost functions are used as a theoretical framework to study the timber production efficiency of community forests. The timber output (Y) is a function of input vectors (Xs) as given below in equation (1).

$$Y_{ti} = f(FA_{ti}, L_{ti}, GS_{ti}, RA_{ti}) \quad (1)$$

Where,
Y_{ti} is the volume of annual harvest from community forests
FA, L, GS, and RA are forest area, labour, growing stock and road accessibility respectively. The subscripts *t* and *i* represent the year of harvest and a particular community forest respectively.

The Cobb-Douglas (C-D) production functional form is used to see the scale effect of logging in community forests. The C-D functional form was selected because it gives a good approximation for the production process, is relatively easy to estimate in logarithmic form (linear in parameters) and parsimonious despite having few limitations (Beattie & Taylor, 1985; Coelli et al., 2005). These limitations are: the elasticity of inputs is constant; restriction of constant returns to scale; and elasticity of substitution is unity.

The C-D functional form is expressed in equation (2).

$$Y_{ti} = \beta_1 FA_{ti}^{\beta 2} L_{ti}^{\beta 3} GS_{ti}^{\beta 4} RA_{ti}^{\beta 5} e^{ui} \quad (2)$$

Where,
Y_{ti} = amount of timber harvest each year
$B_1, \beta_2, \beta_3, \beta_4, and\ \beta_5$ are coefficients of parameters input
u = error term
e = base of natural logarithm

Taking the equation (2) in logarithmic notation:

$$lnY_{ti} = \beta_0 + \beta_2 lnFA_{ti} + \beta_3 lnL_{ti} + \beta_4 lnGS_{ti} + \beta_5 lnRA_{ti} + u_i \quad (3)$$

Where,
$ln\ \beta_1 = \beta_0$
$ln\ Y_{ti}$ is the log form of output (for example, cubic metre production per year)
$lnFA_{ti}$, lnL_{ti}, $lnGS_{ti}$, and $lnRA_{ti}$ are the log form of input vectors, and
u_i is the error term

Alternatively, a cost function is also used to find out the economies of scale. The total cost is a function of output and can be expressed in equation form (4).

$$C = f(X, Px, Y) \quad (4)$$

Where,

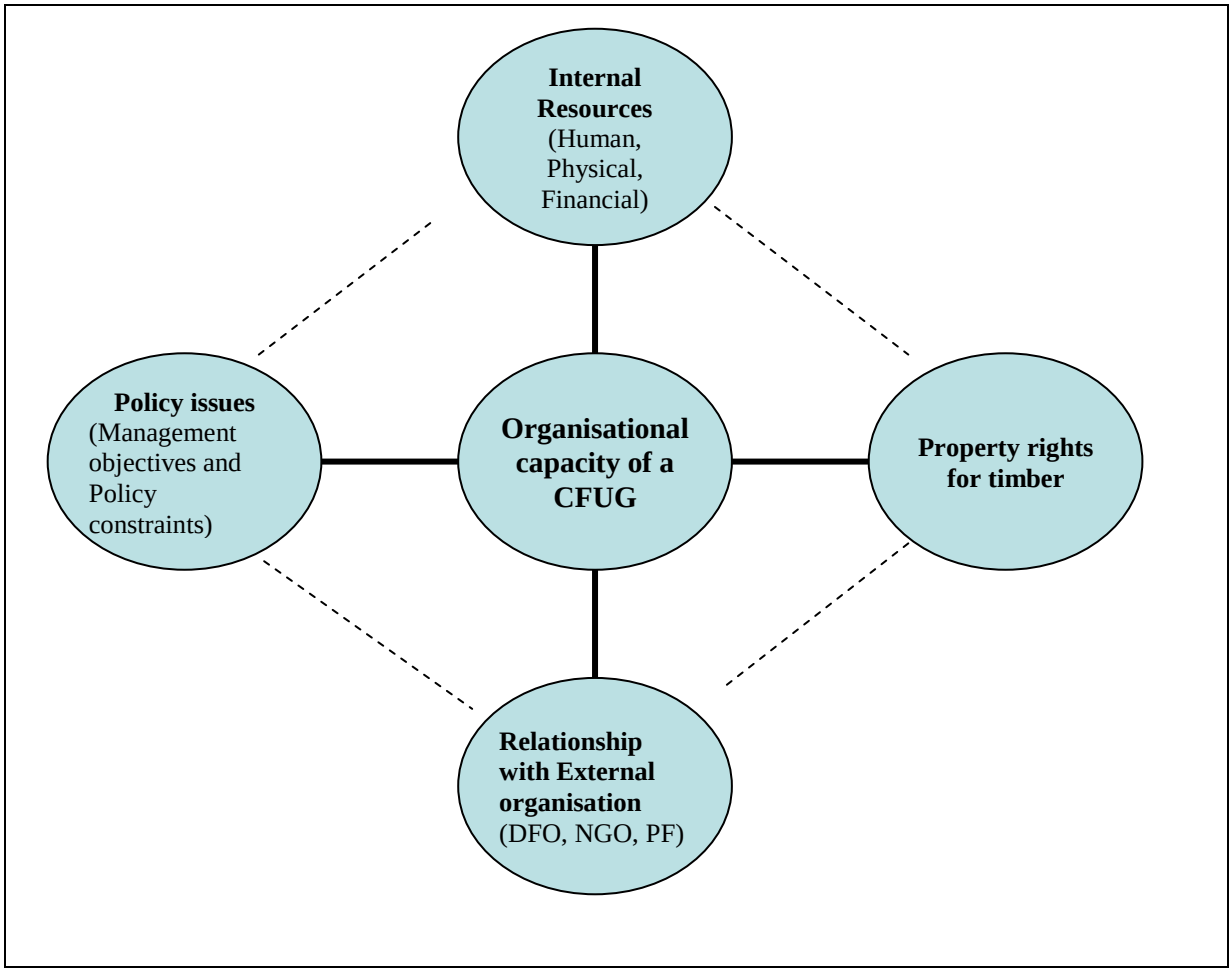
C is the total cost of production
X is the input vector
Px is the price vector of inputs, and
Y is the production amount of timber per year.

Based on the total cost (C) of the annual harvest of timber, average logging costs (ALC) of the timber harvest can be estimated by dividing the total cost with the total output as expressed in equation (5).

$$ALC = C/Y_{ti} \quad (5)$$

2.8.2 Organisational capacity of a CFUG

Based on the literature review, the organisational capacity of a CFUG for timber production and market sales depends on internal resources (such as human capital, physical resources and financial capital), property rights for timber (such as rights for logging, processing and selling), relationships with external organisations, and government policy. These factors of organisational capacity are illustrated in Figure 2.2.



Source: Synthesized from Dolsak & Ostrom 2003; Williamson, 1998; Antinori & Bray, 2005

Figure 2.2 Conceptual model of the organisational capacity of a CFUG.

In addition to the collective effect to the organisational capacity of a CFUG, these factors in Figure 2.2, are inter-related. Internal resources may depend on the property rights for timber, relationships with external organisations and government policy. Potential important external organisations are the DFO, NGO, private firms, the District Cottage and Small Industry Office (DCSIO) and the International Donor Organisations. Also, a CFUG could not make good revenue if the property rights for timber were weak. In turn, the property rights for timber could depend on the government policy. Finally, the relationships a CFUG has with external organisations may depend on government policy.

To organise logging and market sales, a CFUG needs human capital (such as logging labour and a skilful CFUG Committee to manage internal members as well as external organisations), physical resources (such as roads, tractors, logging and sawing equipment) and financial capital. Also, under property rights for timber, rights for logging, rights for timber processing, rights to sell, and rights to use revenue from timber are taken into consideration. Similarly, under relationships with external organisations, relationships a CFUG has with the DFO, with private firms that buy timber from CFUGs and local sawmills, and with local non-governmental organisations (NGO), are considered. Finally, considering government policy includes looking at forest management objectives and policies for logging, processing and selling.

It is expected that those CFUGs which have better resources and better relationships with government and market agents, are better able to utilise their property rights for timber. This enhances their capacity for harvesting timber and arranging market sales. Also, the slight differences in government policy in Terai and Inner-Terai may affect the harvest and market sales of timber.

2.8.3 Contracting and cooperative barriers

Literature review has shown that contracting and cooperative arrangements might be helpful for small producers to integrate vertically with the market. However, there is no formal contracting between CFUGs and private firms. Similarly, there is only one cooperative of five CFUGs out of more than 14,000 CFUGs in Nepal for logging, sawmilling and retailing. These findings indicate that there might be institutional barriers for contracting and cooperative arrangements for vertical integration with the market. Based on the literature review, a simple conceptual model of contracting and cooperative is constructed for this study, Figure 2.3.

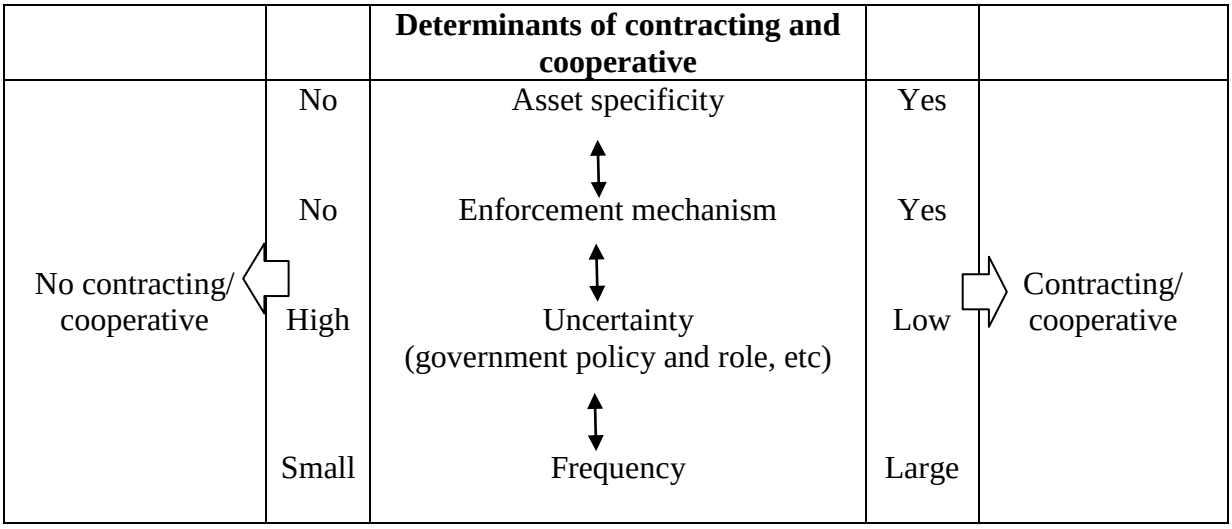


Figure 2.3 Conceptual model of vertical integration through contracting and cooperatives.

The determining factors of contracting and cooperatives are: asset specificity, enforcement mechanism, prevailing uncertainties and the frequency of transactions (Figure 2.3). These factors are interrelated. For example, there is most likely very low or no asset specificity in weak enforcement of contracting. The weak enforcement means weak property rights. Also, if the enforcement is weak or it is difficult to penalise contract breaches, then high uncertainty results. The causes of uncertainty are often the government role and policy, market competition, and production uncertainty because of man-made and natural factors such as timber theft, forest fire and natural disease. Finally, uncertainty affects the frequency (volume and number) of production and market transactions.

Positive asset specificity, good enforcement, some degree of uncertainty, and large frequency make it favourable to enter into a contracting/cooperative relationship in community forestry, for vertical integration of timber with the market. The reverse situation of these factors favours no contracting and cooperative.

2.9 Chapter summary

In this chapter, the literature about CPR and collective actions, CFUGs and the theory of the firm, new institutional and transaction cost economics, the production theory of economics, characteristics of successful firms, and vertical integration and contracting and cooperatives, were reviewed. The main purpose of reviewing these literatures is to synthesise a business approach of a CFUG, as a social firm.

The literature about collective action of CPRs shows that local institutions of user groups are involved widely in sustainable management of resources. However, there is not a common modality of the CPR institution that can be applied everywhere. The thrust of effective and sustainable CPR management depends on the capacity of the local users, and the support of government, non-government and market agents to them. A CFUG is an effective local institution of community forestry. From the perspective of the theory of an industrial firm, a CFUG can be considered a social firm for timber production and business. Like a private or a state firm, the social firm engages its resources in timber production and market exchange.

New institutional and transaction cost economics-related literature, shows that transaction costs were positive in the real world because of information costs, the incomplete nature of contracts, and opportunism. Further, the transaction costs depend on the institutional factors such as the rules of the game, or property rights over resources, polity, and judiciary. Therefore, a firm is more than a technological and allocation construct – a study of production efficiency alone cannot explain the whole picture of a firm.

The production economics literature shows that the production efficiency of logging depends on forest area, growing stock, machines, road access, labour, and technology. To study logging efficiency, Cobb-Douglas production and translog functional forms are commonly used by researchers in industrial and state forestry.

Similarly, literature related to the characteristics of successful social firms, shows that organisational capacity in terms of internal resources (human capital, physical resources and financial capital), property rights for timber, relationships with external organisations, and government policy, were potential factors for successful timber production and market sales. Likewise, contracting and cooperative arrangements, especially for small producers, were found to be helpful for vertical integration with the market.

Finally, based on the literature reviews, a business approach of a CFUG, as a social firm, is synthesised. This business approach provides conceptual models for three research objectives. The first approach is estimating logging efficiency by production and cost functions. The second approach gives a conceptual model to study the organisational capacity of a CFUG. The third approach gives a conceptual model of vertical integration through contracting and cooperative. Materials and methods of this study, employing these conceptual models are given in Chapter 3.

Chapter 3
Materials and Methods

3.1 Introduction

The previous chapter reviewed literature related to timber production analysis, characteristics of a successful social firm, vertical integration with the market, and contracting and cooperative arrangements of smallholders in the context of a community forest user group (CFUG) as a social firm. The literature leads to a synthesis of a business approach of a CFUG that gives three conceptual models, based on the research objectives stated in Chapter 1. The purpose of this chapter is to explain materials and methods of data collection and data analysis that are required by these conceptual models as guided by the literature review.

This chapter begins with a background of the study area (Section 3.2). Then, this chapter is organised into two main sections, based on the nature, collection and analysis method of data. Section 3.3 covers materials and methods of timber production efficiency. This is a quantitative assessment. Section 3.4 explains materials and methods of investigating, the organisational capacity and institutional barriers for contracting and cooperative for vertical integration with the market. This is a qualitative assessment. Finally, a chapter summary is drawn (Section 3.5).

3.2 Study area: Rupandehi and Udayapur districts

Rupandehi district of the Western Terai region and Udayapur district of the Eastern Inner-Terai region of Nepal are selected for this study (Figure 1.1). There are three reasons for selecting these districts. Firstly, both districts have Sal forests under community management, which is the focus of this study. Secondly, these districts have been implementing a CF programme for nearly 20 years (Bampton & Cammaert, 2006; Laubmeier & Warth, 2004). Finally, the government may have been implementing slightly different forestry policies in these two districts as they represent slightly different administrative regions. So, findings from these districts could be compared to the implications of different policies.

General characteristics of the study area districts, along with the national figures are given in Table 3.1. Rupandehi district represents 0.93 percent of the national area, 2.7 percent of the national population, 0.67 percent of the national forest area, 0.4 percent of the national CFUG numbers, and 0.68 percent of the national community forest area (Table 3.1). The other district Udayapur represents 1.4 percent of the national forest area, 1.1 percent of the national

population, 2.44 percent of the national forest area, 1.56 percent of the national CFUG numbers, and 4.3 percent of the national community forest area.

Table 3.1 General characteristics of study area.

Description	Unit	National Total #	Study district *	
			Rupandehi	Udayapur
Area (’000)	Hectare	14,718	136.8	206.3
Population (‘000)	Number	26,427	708.4	287.7
Forest area (’000)	Hectare	4,800	32	117.3
CFUG	Number	14,000	56	218
Community forest area (‘000)	Hectare	1200	8.2	51.6

Source: *District Forest Office Rupandehi and Udayapur 2007; # Kanel 2005; CBS Government of Nepal 2007.

Thus, compared to the national picture, representation of the Rupandehi district is higher in population and lower in CFUG numbers, whereas representation of the Udayapur district is higher in forest area, CFUG numbers and community forest area. Because of different geographical locations, these districts are different to one another – population is concentrated in the Rupandehi district, whereas forests and CFUGs are concentrated in the Udayapur district.

3.3 Timber production efficiency

Timber production refers to logging for market sales from community forests. The amount of timber production, as an output, depends on several inputs such as forest area, labour, growing stock of forest, road accessibility, and the geographical location of the community forests. The output and input data are collected to estimate the Cobb-Douglas production function. Also, data related to costs associated with timber production and related to revenue are collected to estimate cost function. The participants of this study are CFUGs of the Terai and Inner-Terai regions of Nepal.

This section is organised into three subsections. The first subsection (3.2.1) deals with the sample design of data collection method. The second subsection (3.2.2) explains the survey instruments used to collect the data. And the third subsection (3.2.3) covers the data analysis procedure to determine the timber production efficiency – the economies of scale of logging in community forests.

3.3.1 Sample design

The sample design in this subsection covers mainly the analysis of timber production efficiency in CFUGs. The sample design is carried out in two stages. To begin, a list of community forests was taken from the DFOs that were in operation in the year 2006/07. The

Nepalese financial year begins on the first day of *Saun*, the fourth Nepalese month, which falls roughly on the 16th of July, and finishes at the end of *Aasar*, the third Nepalese month, which falls roughly on the 15th of July following. Then, community forests were divided into two categories; low altitude forest where Sal is grown and high altitude forest where Sal cannot be grown. Twelve community forests were found to be high altitude forests in the Udayapur district and were therefore excluded from the population list, Table 3.2.

At the second stage, 99 CFUGs (about 36% of the total population) were sampled applying a simple random sampling technique. Simple random sampling is a method which gives equal chance to be selected to be a participant in the study. This sampling method has the greatest generalising ability compared to other random and non-random sampling techniques (Sekaran, 2000). As the focus of this study is to study timber production from community forests, it was attempted to apply random sampling in timber harvesting CFUGs only. However, at the initial stage, data from the DFO was not clear as to which CFUGs harvested timber and which did not in the year 2006/07.

Table 3.2 Population of CFUG and Sample.

Population of CFUG in study area (N)			Number of CFUG sampled		
Rupandehi	Udayapur	Total	Rupandehi	Udayapur	Total
56	218*	274	22	77	99

Note: * 12 out of 230 CFUGs were excluded because they had non-Sal forest due to high altitude.

Although the focus of this study was on cross sectional data for the year 2006/07, it was intended to collect data for two earlier years 2005/06 and 2004/05 as well. However, getting three years panel data from sampled CFUGs became doubtful because of three reasons. First, the CFUGs may not have produced timber each year. Second, some of the sampled CFUGs were established just in the year 2006/07 (Laubmeier & Warth, 2004). Third, old records were difficult to find because of poor recording in the CFUGs.

To save costs and time, data related to timber production and market sales was collected mainly from secondary sources that have records of the DFO, and work plans of the CFUGs stored in the DFO. Saving costs and time is the principle requirement of the sampling method (Sekaran, 2000). Therefore, accuracy of inferences drawn from samples, and the saving of costs and time has a trade off. Some sample CFUGs in Table 3.2 were visited, some were not, to collect data. Office records include all correspondence from the DFO to the CFUGs and vice versa regarding timber harvest and sales. Additionally, missing and ambiguous data about timber production, costs and revenue was noted and collected and clarified in the second part of the survey. Personal interviews and field visits to CFUGs, government

organisations, private firms, non-governmental organisations and informal interaction with key respondents, was carried out.

3.3.2 Survey instrument

Survey instruments can be defined as the set of check lists or questionnaires, which is designed to elicit information from participants, and to define methods of measurement of information. In this case, the CFUG as a production firm is the participant. Questionnaire 1 is designed for CFUG participants and is structured in three parts. Part I, is aimed at collecting quantitative data mainly from secondary sources. Part II and Part III are designed to collect qualitative information to study the organisational capacity of a CFUG and contracting/cooperative barriers for vertical integration with the market. Part II and Part III are explained in the next section. Details of Questionnaire 1 are given in Appendix B.

To estimate the Cobb-Douglas production function and cost function as synthesised in subsection 2.8.1, timber production input and output variables, associated costs, revenue, unit of measurement and methods of measurement are given in Table 3.3.

Table 3.3 Factors of timber production, cost, revenue, measurement unit, sources.

Variable	Symbol	Unit	Sources of data
Annual harvest of all species	Y	m3	Secondary
Annual harvest of Sal	Ys		Secondary
Annual harvest of medium price timber	Ym		Secondary
Annual harvest of low price timber	Yl		Secondary
Household	HH	Number	Secondary
Annual allowable cut (All)	AACall	m3	Secondary
Annual allowable cut (Sal)	AACsal	m3	Secondary
Forest area	FA	Ha	Secondary
Growing stock (All)	GSall	m3/ha	Secondary
Growing stock (Sal)	GSsal	m3/ha	Secondary
Distance of road from forest	Dist	Km	Secondary
Geographical location	GL	Ordinal	Secondary
Logging labour	Ll	Man day	Secondary + primary
Logging cost	Cl	Rs/m3	Secondary + primary
Transportation cost	Ct	Rs	Secondary + primary
Internal sale	IS	m3	Primary
Market sale	MS	m3	Primary
Price (Internal sale)	Pi	Rs/m3	Secondary + primary
Price (Market sale)	Pm	Rs/m3	Secondary + primary

The total annual harvest is collected from community forests and is divided into three categories; Sal, medium price timber and low price timber. The medium price timbers are Asna (*Terminalia tomentosa*) and Karma (*Adina cardifolia*). Others are low price timber or

just firewood because they are not used for construction. Most of the variables of Table 3.3 were expected to be collected from secondary sources. However, the logging labour and costs, transportation costs, and sale prices might not be available from secondary sources. For these variables, primary sources will also be used.

3.3.3 Data analysis

Estimation of a Cobb-Douglas production function or cost function is done by using an ordinary least square (OLS). A Cobb-Douglas production function of timber is estimated to see the best combination of input factors to produce a maximum amount of output from the given technology. Also, the cost function is estimated to find out the cheapest way of logging in community forests.

3.4 Organisational capacity and contracting/cooperative barriers

A conceptual model of the organisational capacity of a CFUG (Figure 2.2) requires in-depth information on internal resources, property rights for timber, relationships with external organisations and government policy. A conceptual model of contracting/cooperative barriers (Figure 2.3) requires detailed information about asset specificity, enforcement mechanisms, and uncertainty and frequency of transactions. The detailed or in-depth information is usually referred to as qualitative data. A qualitative data approach is appropriate in a number of situations, for example, where detailed information is required to determine the exact nature of the issue under investigation, or where the information is only available in non-numeric form (Bazely, 2007).

The method for studying the organisational capacity of a CFUG and the contracting and cooperative barriers for timber production and market sales, is explained in three subsections. The first subsection (3.4.1) explains the selection of participants (sample design). The second subsection (3.4. 2) deals with the survey instrument. The third subsection (3.4.3) describes the data analysis including an overview of the NVivo 8 software, a qualitative method for data analysis.

3.4.1 Selection of respondent (Sample design)

To study the organisational capacity and the contracting and cooperative barriers, data from CFUG participants only is insufficient. Therefore, data was collected not only from CFUGs, but also from other important stakeholders of CFUGs such as government organisations, private firms and non-governmental organisations for timber production and market sales.

Similarly, the organisational capacity and the contracting and cooperative barriers models need specific responses. Therefore, a non-random sampling method is used. Richards (2005) argues that in qualitative study, the sample size of interviews, cases, and field visits depends upon the data needed to answer the questions asked in the research. Non-random sampling is always a purposive method. Purposive means the researcher always uses some rationale to select samples. Within the non-random sampling method, a combination of intensity and snowballing sampling techniques was used to select samples. The sample design is also based on the required validity. However, in qualitative study, the rigour of validity is subjective, for example "Data in themselves cannot be valid or invalid; what is at issue are the inferences drawn from them" Maxwell (2002) in Huberman and Miles (2002). Within the non-random and purposive sampling, the snowballing method of sampling is applied in cases where participants are not known beforehand. In this method, samples are selected based on the information given by the key informants, and the sample selection process is continued until new theme or factor, stops coming from key informants.

For the selection of key respondents from CFUGs, the same sample set (Table 3.2) is used. Two reasons for using the same sample set are: to save costs and time; and to find in-depth information as to why some CFUGs produced timber and the others did not. For the selection of key respondents from government organisations, key offices such as the DFO and the District Cottage and Small Industry Office (DCSIO) were selected. Within these offices, key positions were selected for interview. For the selection of key respondents from private firms and non-governmental organisations, information from key respondents of CFUGs and government organisations was used. Private firm refers to log buying contractors, saw millers and wholesalers/retailers. A list of participating organisations for the survey and the number of key respondents is given in Table 3.4.

Table 3.4 List of participating organisations and number of key respondents.

Organisation	Number of key respondents (sample)		
	Rupandehi	Udayapur	Total
CFUG	9	12	21
Government organisation (GO)	4	6	10
Private firm (PF)	3	5	8
Non-government organisation (NGO)	1	1	2

Detailed profiles of these key respondents are given in Chapter 6.

3.4.2 Survey instrument

A semi-structured open ended questionnaire is used to elicit information about the different specific aspects of the organisational capacity of a CFUG, and contracting/cooperative barriers for timber production, from the key respondents as shown in the conceptual models (Figure 2.2 and Figure 2.3). As the key respondents are from CFUGs, government organisations, and PFs, three different sets of semi-structured open-ended questionnaires are needed. For key respondents of CFUGs, a number of questions about organisational capacity (Part II) and contracting and cooperative (Part III) are added to Questionnaire 1, from the previous subsection (3.3.2). For key respondents of government organisations and private firms, separate Questionnaires (Questionnaire 2 and Questionnaire 3) were designed.

The Part II of Questionnaire 1 (for CFUG) consists of all questions related to the organisational capacity of a CFUG. The Part is further arranged in four sections: (A) Other resources; (B) Property rights and investment; (C) Decision making and internal management; and (D) Relationships with external organisations. Section A includes questions such as reasons for not harvesting, physical capital, and human capital. Section B covers ownership of timber and all rights-related questions such as logging rights, processing rights, selling rights, revenue use rights including the status of community funds, and investment possibilities. Section C includes questions related to determining factors of harvest and market sales, forest management objectives, delegation of authority, internal disputes, market information and profitability, and policy issues. Section D covers all questions about relationships with government organisations, non-governmental organisations, and private firms.

The Part III of Questionnaire 1 covers questions related to existing contracting and cooperative arrangements, respondents' perception about advantages and disadvantages, uncertainties about private firms' behaviour and markets, enforcement mechanisms of contracting, and constraints of contracting and cooperative arrangements. Details of the Questionnaire are given in Appendix B.

The government staff Questionnaire is organised in two parts. Part I covers open ended questions about the organisational capacity of a CFUG. This part is further organised in five sections. Section A includes questions about the introductory information. The other four sections cover a number of specific questions on almost the same aspects and in similar fashion to the CFUG Questionnaire. The government staff Questionnaire is given in Appendix B, Questionnaire 2.

The private firm Questionnaire is also organised in two parts. Part I is slightly different from the government staff Questionnaire and the CFUG Questionnaire. In this, questions about the organisational capacity of private firms instead of CFUGs and the importance of community forests, are included. The questions about the key factors for organisational capacity are similar to sections A, B, C, and D in the CFUG Questionnaire. Details are given in Appendix B, Questionnaire 3.

These Questionnaires were initially designed in English. In the personal interview, human subjects are involved in expressing their views, therefore approval from the Human Ethics Committee (HEC) of Lincoln University was taken. These Questionnaires were then translated in Nepali language before launching the survey. Four pre-test personal interviews of these Questionnaires were carried out to check clarity and difficulty if any of questions. The unclear questions were revised and adjustments made before launching the real personal interview.

An in-depth personal interview with key respondents is conducted to collect data for the organisational capacity of a CFUG and contracting and cooperative barriers. The personal interview method has the great advantage of face to face clarification of questions to both interviewee and interviewer (Sekaran, 2000). The disadvantage of this method is, it is time consuming and therefore, costly.

Thirty nine personal interviews of key respondents of CFUGs, government organisations and private firms were conducted. These interviews are recorded on a digital voice recorder with the consent of interviewees as well as on the Questionnaire paper. These recorded interviews are transcribed to text and used for data analysis. In the case of NGOs however, only informal interactions were made about issues of organisational capacity and contracting/cooperative barriers of CFUGs. Profiles of participating organisations and details of key respondents are given in Chapter 6.

Furthermore, a triangulation method of verification is used. Information given in the interviews is cross checked with the official records and field observations to verify the validity of information given by the respondents. A triangulation method of verification is used to increase the validity of the data and to increase the scope of the ability to generalise about results drawn from this data.

3.4.3 Data analysis: NVivo computer software

Data is analysed using the NVivo – 8 computer software. Additionally, simple quantitative tools such as frequency count and arithmetical average are used. NVivo is one of the most commonly used qualitative data management and analysis software systems, developed by the Qualitative Society of Research International (QSRI) along with other techniques such as SPSS and content analysis. NVivo software is a powerful tool for analysing qualitative data in five ways: managing data; managing ideas; query data; graphical model; and reports from the data (Bazeley, 2007). Basically, NVivo software uses textual forms of data. The process of data feeding and analysis using NVivo software is illustrated in Figure 3.1.

At the first stage, data from interviews, observations, photographs and video film are transcribed or summarised into "text" form (Figure 3.1). The text form of interview is called transcript (Tc). The text form as a summary of observations, photos, and film is called memo (Mm). These textual forms of data are feed into the NVivo software.

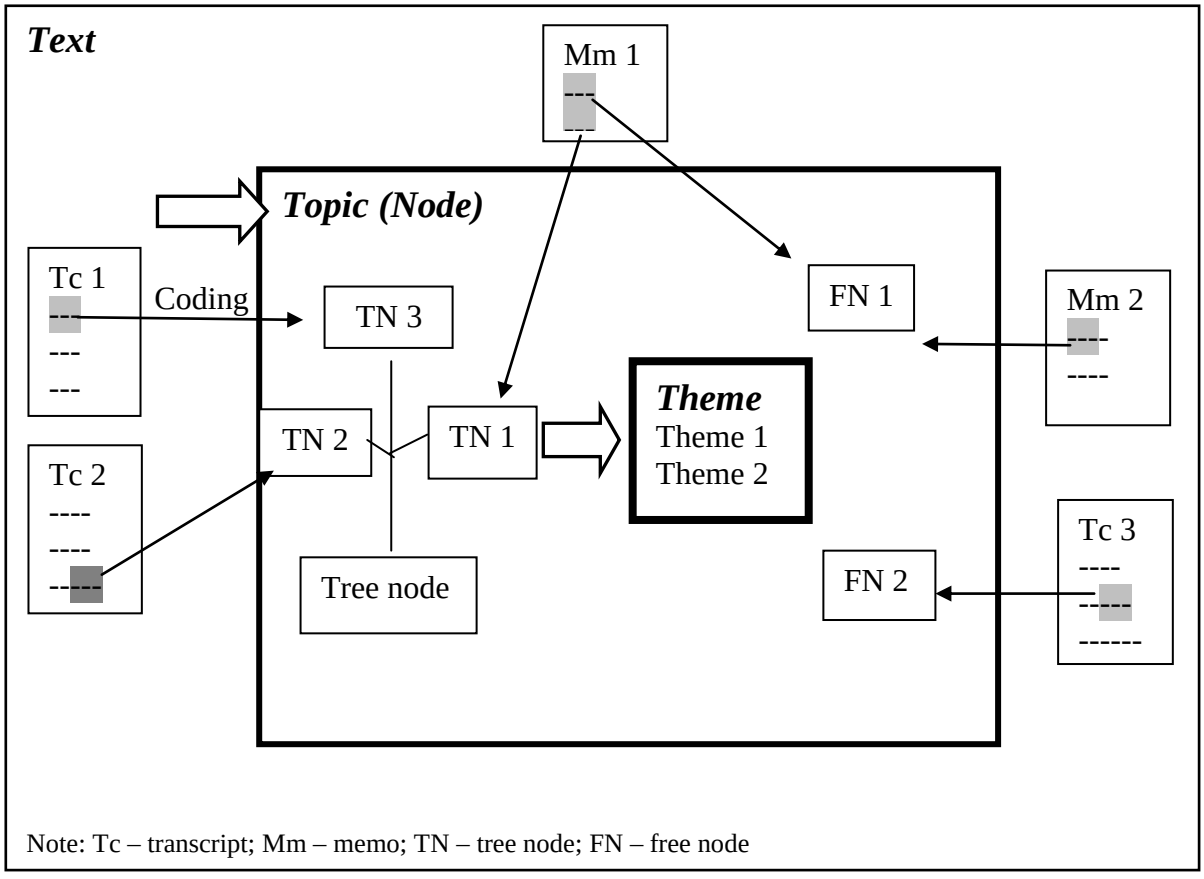


Figure 3.1 NVivo process of coding and drawing themes.

At the second stage, these textual forms of data are read carefully, and important information or ideas are fractured from the original source and collected into a node. This process is called coding. The node can be compared to a topic or issue. Professor Hansen[1] compared this process like collecting gems into buckets based on their quality and type. Gems are codes and buckets are nodes. If these nodes are interlinked as we go through the process of coding, then these interlinked nodes are called tree nodes – it looks like a tree (main node) and branches (related nodes – TN1, TN2, TN3 in Figure 3.1). The creation of tree nodes is done based on the logical hierarchy. All other nodes, that are not connected to the main node or do not follow in a logical hierarchy, are called free nodes (FN). There will be more free nodes at the beginning of the coding process, but as data analysis goes on, these nodes fit more into tree nodes.

The beauty of NVivo software is the coding process into multiple nodes at the same time. If codes are linked to more than one node, then it is called an interlinkage or relationships of ideas. More and more linkages emerging from the data will lead to the creation of a theme (Figure 3.1). A theme is the main idea of a story or essay. There is no exact definition but there could be the definition of the interchangeable use of a theme with concept and category, (Strauss and Corbin 1998 in Bazely (2007)), although, I agree more with the view of Richards and Morse (2007), about themes. According to them, a theme is more pervasive than a category or topic, and runs as a main idea which involves abstract thinking.

In grounded theory, methodology themes are used to create a new theory (Strause and Corbin 1990). In other research, which does not aim to generate a new theory but rather works on an established theory, themes are created to support an existing theoretical framework or hypothesis. This study follows the second approach; themes are created from data and compared with the hypothesised themes. In addition to generating themes from the data, this software powerfully and efficiently creates and presents the summary.

3.5 Summary

The materials and methods of data collection and data analysis, for the study of timber production and market sales from community forests of the Terai and Inner-Terai regions of Nepal are explained in this chapter. Rupandehi and Udayapur districts are chosen from the Terai and Inner-Terai regions respectively, because of three different reasons explained earlier.

[1] Professor John Hansen of Waikato University New Zealand, personal communication in June 2008

To investigate the timber production efficiency, data from 99 randomly selected community forests was selected. Data related to timber production, associated input factors, costs, and revenue for the years 2006/07, 2005/06, and 2004/05 was collected mainly from secondary sources. Using this data, the Cobb-Douglas production function or cost function was expected to be estimated. Results related to timber production efficiency are given in Chapter 5.

To examine the organisational capacity of a CFUG and contracting and cooperative barriers, data was collected from personal interviews with purposely selected 39 key respondents of CFUGs, government organisations and private firms. A survey instrument was developed that consisted of a range of questions related to specific factors, which are shown in the conceptual models. The specific factors of the organisational capacity model were: internal resources; property rights for timber; relationships with external organisations; and government policy for timber production, processing and market sales from community forests. The personal interviews with key respondents, was expected to be analysed primarily by the NVivo computer software. Results of organisational capacity are presented in Chapter 6.

Also, the institutional barriers for the contracting and cooperative conceptual model, included factors such as asset specificity, uncertainties, enforcement mechanisms and the frequency of the transactions. For this, data was collected from the same interviews of the 39 key respondents, and data analysis followed the same NVivo computer software technique as mentioned above. Results of institutional barriers for contracting and cooperatives are given in Chapter 7.

Chapter 4
Descriptive Analysis of CFUGs

4.1 Introduction

The previous chapter explained the materials and methods employed for this study. This chapter presents a descriptive analysis of the study area and the CFUGs that were under study. This chapter has three purposes. The first purpose is to examine characteristics of districts and sample level CFUGs under study. The second purpose is to examine the representativeness of samples with the district level population of CFUGs. This will help to see the strength of the generalising ability of inferences drawn from the samples, into a wider population. The third purpose is to provide background information for further analysis in Chapter 5.

The chapter is presented in four sections. The first section (4.1) introduces the purpose and structure of the chapter. The second section (4.2) gives district level statistics focussing on the characteristics of CFUGs. The third section (4.3) deals with the sample descriptions and examines the representativeness of the sample. Finally, the fourth section (4.4) draws a summary of the chapter.

4.2 District level descriptive statistics

The purpose of district level descriptive statistics for the two districts that are under study is to provide a background to community forestry in these areas. Additionally, this information will help to identity similarities and differences, as these districts represent two different administrative regions – Terai and Inner-Terai. As the focus of this study is on timber production in community forests, this section is organised in two subsections: characteristics of CFUGs (4.3.1); and characteristics of forest resources under community forestry (4.3.2). Data for this section is drawn from the characteristics of 274 CFUGs collected mainly from their respective DFOs. Additionally, records from the Department of Forests were used.

4.2.1 Characteristics of CFUGs

Characteristics of CFUGs are referred to as the number of households (HH) per group, forest area, forest endowment per household, and years of operation (Table 4.1). These characteristics are important for timber production and organising market sales. If household numbers are too big, then there is likely to be some kind of difficulty in the management of the group, and meeting all members' timber and other needs. Also, there is less likelihood of

producing timber from a small forest. Timber production would be further less likely from a degraded or regenerating young forest.

Table 4.1 Characteristics of CFUGs in the study districts.

Characteristics	Rupandehi district				Udayapur district			
	Min	Max	Mean	Med	Min	Max	Mean	Med
Household (no.)	19	6500	718	296	22	939	189	148
Forest area (ha)	0.8	1558	147	47	4.6	834	237	218
Forest endowment (ha/HH)	0.02	0.88	0.21	0.13	0.07	4.9	1.51	1.34
Year in operation	2	17	7.5	6	1	15	5.9	4

Source: District Forest Office and Department of Forest 2008.

Table 4.1 shows that the Rupandehi district on average has a high number of households in each CFUG and less forest area, than the Udayapur district. The mean of household numbers (718 HH) in Rupandehi is almost four times higher (189 HH) than in Udayapur. This high mean number of households in Rupandehi is attributed to higher population density compared to Udayapur. The average population densities in the former and latter districts are 518 and 140, respectively, per square kilometre (Table 3.1).

The distribution of household numbers in CFUGs is different in the two districts (Figure 4.1). In the Rupandehi district, CFUGs are distributed across a wide range of categories from small to very large numbers of households, whereas in the Udayapur district, most of the CFUGs have a small number of households. The most frequent category of CFUG size in Rupandehi is “More” which represents 600 or more HH (about 27 percent). This category includes a range of households from 600 HH to 6500 HH. In contrast, this category accounts for only about 3 percent of the CFUGs in the Udayapur district. In Udayapur, more than two thirds (67%) of the CFUGs consist of less than 200 HH.

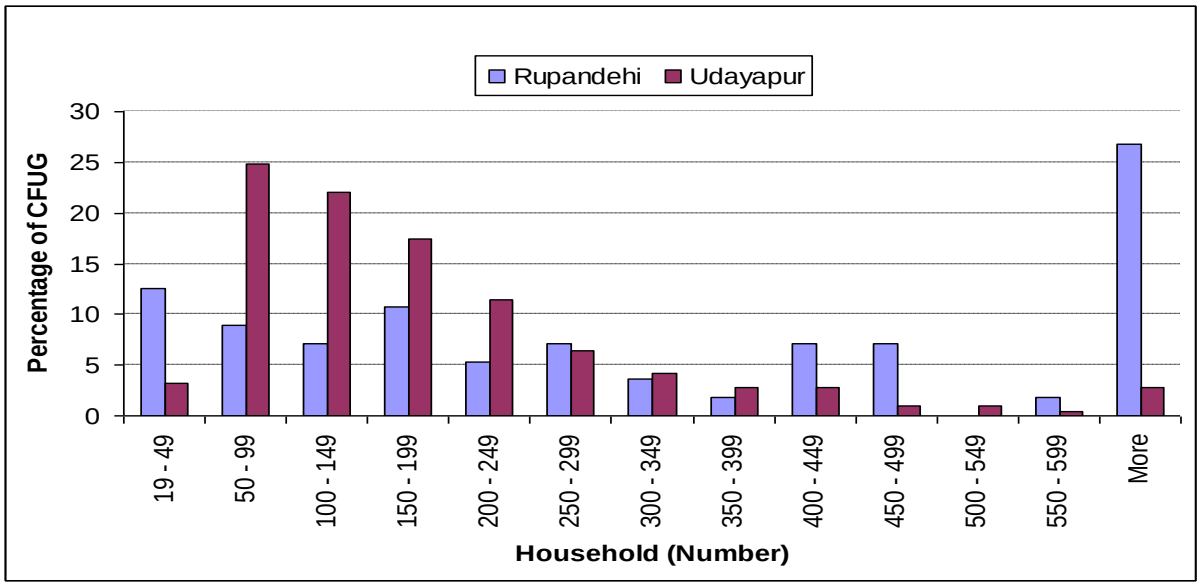


Figure 4.1 Distribution of CFUG by number of household.

The mean forest area of CFUGs in the Rupandehi district is about 40 percent smaller than the mean forest area of CFUGs in the Udayapur district. The distribution of forest area per CFUG is also different in the two districts (Figure 4.2). CFUGs in the Rupandehi district can be characterised as having small forests, whereas in the Udayapur, CFUGs have medium sized forests. For example, in the Rupandehi district, about 52 percent of CFUGs have less than 50 ha of forest, and about 18 percent of CFUGs have 50 to 99 ha of forest. Two possible reasons for this high percentage of small forests under community management might be, either forest remnants in several small patches or conservative government forest-handover policies.

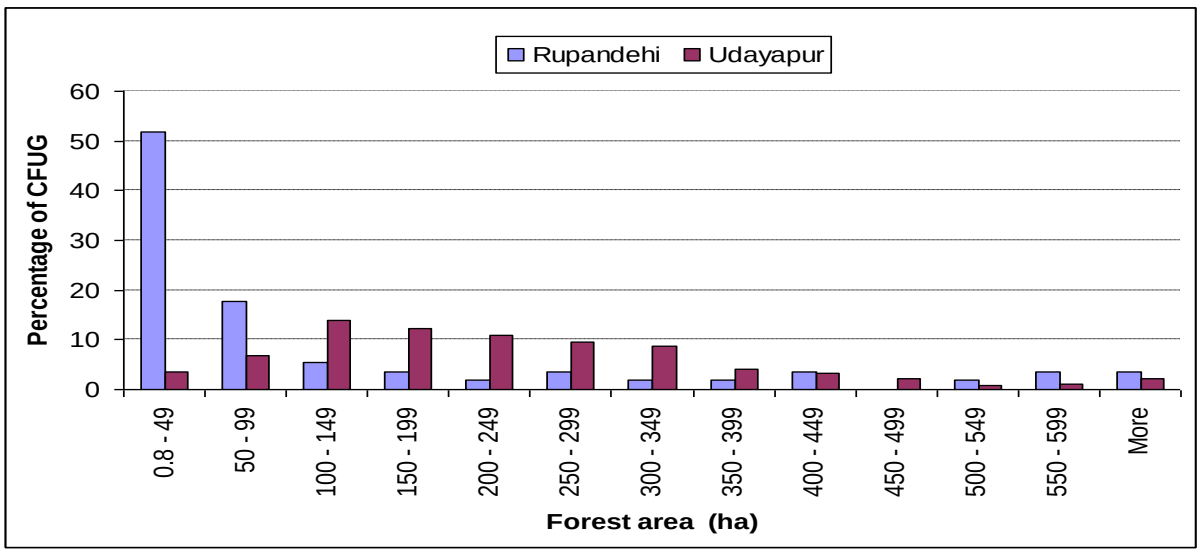


Figure 4.2 Distribution of CFUG by forest area.

Compared to the Rupandehi district, forest area per CFUG in the Udayapur district is better. Forest areas between 100 ha and 349 ha account for 56 percent of CFUGs. A small amount of timber harvest can be expected from these medium sized forests, provided these forests are in good condition.

As a result of higher household numbers and smaller forest area, the distribution of forest endowment per HH in these two districts is very different. The forest endowment is an important characteristic as this shows how much forest resource is potentially available for the benefit of each household. The mean forest endowment per HH in the Rupandehi district is just one fifth of a hectare compared to 1½ ha in the Udayapur district (Table 4.1).

Forest area endowment per household distribution, in the two districts is very different (Figure 4.3). Forest endowment per household in the Rupandehi district is very small compared to the Udayapur district. In Rupandehi, about 70 percent of the CFUGs have a forest endowment of less than 0.25 ha/HH, whereas in Udayapur about 67 percent of CFUGs have more than 1 ha/HH, and in some cases up to 4.9 ha/HH. In Rupandehi, 21 percent of the CFUGs have 0.26 – 0.50 ha/HH.

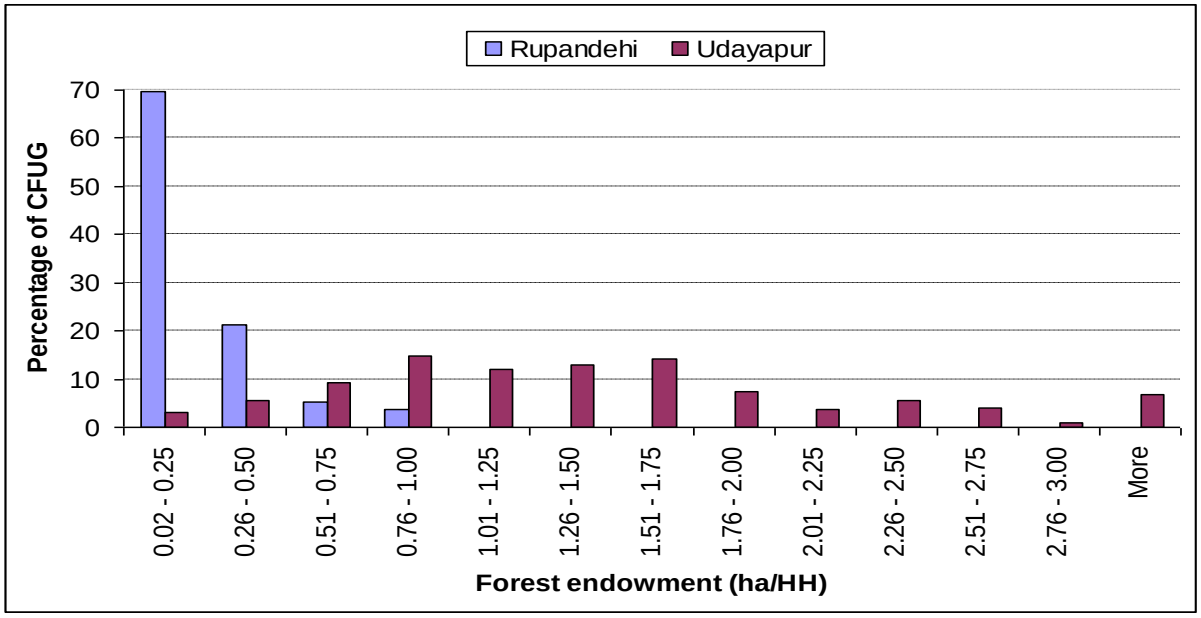
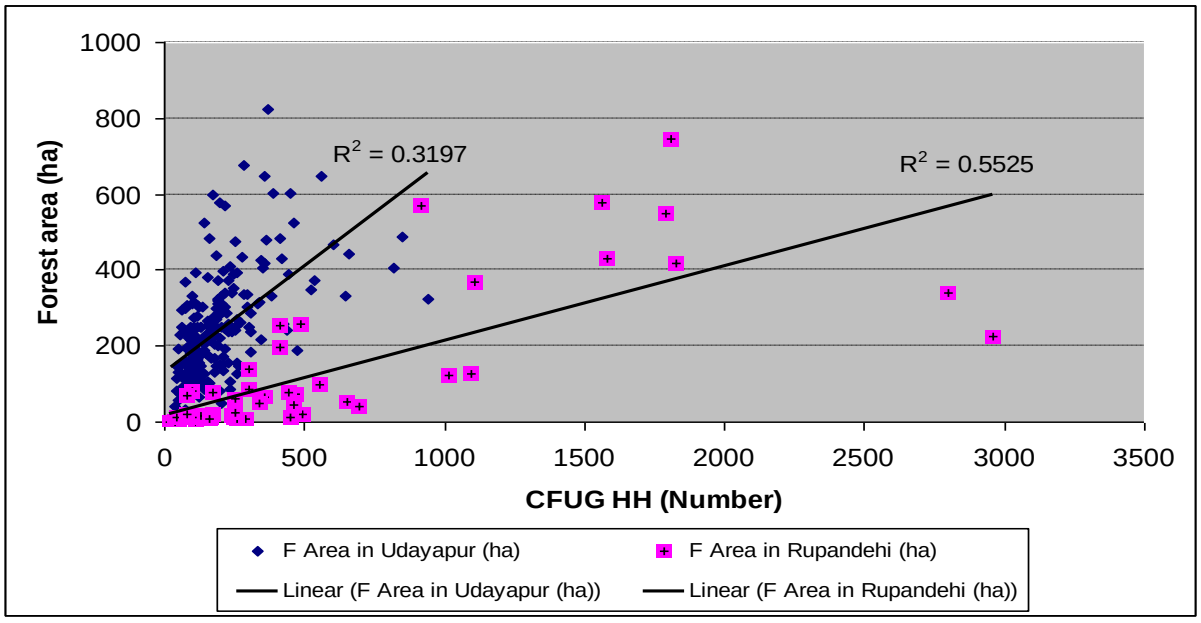


Figure 4.3 Distribution of CFUG by forest endowment.

The mean years of operation of CFUGs are similar in the two districts (Table 4.1). On average, CFUGs in the Rupandehi district are 7.5 years old and in the Udayapur district are

5.9 years old. In the Rupandehi district, CFUGs started operating 17 years ago, before the Udayapur district which started operating 15 years ago.

It is interesting to examine what determines how much forest area was handed to CFUGs in the two districts. One DFO staff member of the Udayapur district[2] stated that the guideline was "a hectare forest to a household". The relationship of forest area to households is examined in Figure 4.4. It is clear that the forest handover guideline is approximately applied in the Udayapur district but not in the Rupandehi district. The rate of forest handover in the Rupandehi district is substantially lower than the guideline. In the Rupandehi district, the rate is only about 0.20 ha of forest per household.



Note: Two very big CFUGs from Rupandehi are excluded in the graph to increase illustration

Figure 4.4 Forest handover rate against households in two study districts.

Potential reasons for the different rates of forest handover are either: the government is applying different forest handover policies in the two districts; or the government ran out of sufficient forest to handover further, based on household numbers particularly in the Rupandehi district. However, in Rupandehi, there are still about 24,000 ha of government forest (Table 3.1), which is three times larger than the current area of community forests.

It is important to understand how the forest endowment influences an individual households' motivation to participate in community forestry activities. Additionally, the forest endowment may affect the overall performance of the group, for timber harvest and market sales. A hypothesis is that it is more likely, that members of CFUGs with a low forest endowment are

[2] Personal communication in 2004.

less active or less engaged in community forestry, because of the lower possibility of benefit from the forest. Conversely, members in CFUGs with a high forest endowment are more likely to be active or engaged in community forestry because of the potential benefit from the forest. The second hypothesis is that it is more likely that CFUGs with a high forest endowment produce more timber and therefore, more sales to the market. These hypotheses will be analysed in Chapter 6.

Finally, the distribution of CFUGs by the year of forest handover or operational years, in the two districts is illustrated in Figure 4.5. Generally, the CFUG starts operation formally once the forest is handed over to them. Prior to forest hand-over, a group might exist, but is not considered to be operating formally due to a lack of authority over a forest.

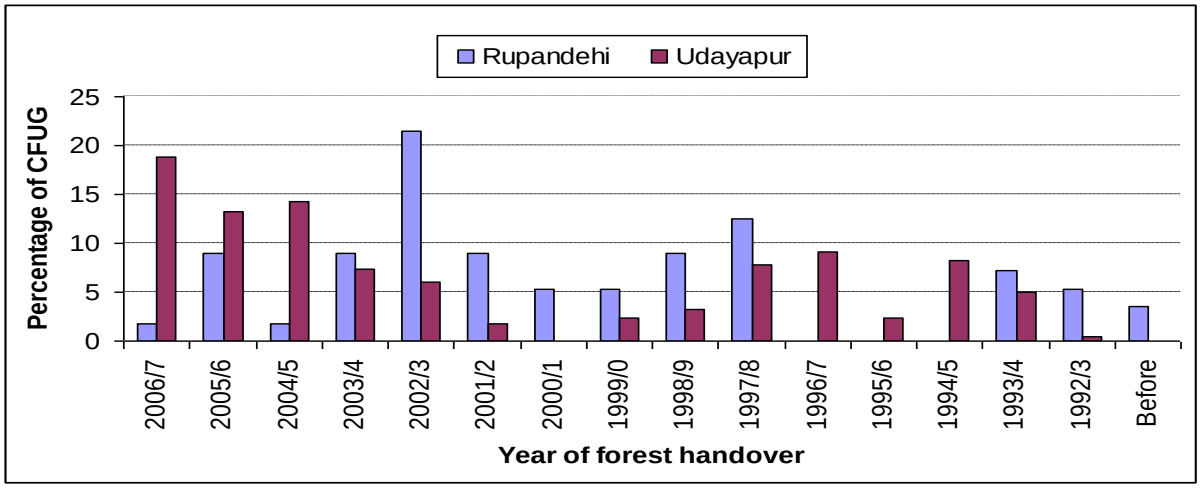


Figure 4.5 Distribution of CFUG by the year of forest handover.

The distribution of CFUGs by the year of forest handover in the two districts, have some differences and some similarities (Figure 4.5). Differences in the two districts are that in Rupandehi, a large number of CFUGs were created between 1997 and 2003, whereas in Udayapur, a large number of CFUGs were formed between 2003 and 2007. The reason behind this difference is not known. Similarities in these two districts are: firstly, forest handover started almost at the same time, in the years 1992/93 in Udayapur and a couple of years prior to this in Rupandehi; and secondly, there were two sharp decreases in the rate of forest handover in the years 1995/96 and 2000/01. It is likely that the two government policies – Operation Forest Management Plan (OFMP) 1996 and Forestry Sector Policy (FSP) 2000 – are responsible for the sharp decrease in the rate of forest handover. The OFMP, which was designed to manage well stocked national forests of 19 Terai and Inner-Terai districts by the

government, was opposed by the local people (Bampton & Cammaert, 2006). Also, Kanel (2006) argued that the FSP 2000 constricted community forestry in the Terai and Inner-Terai regions by redirecting community forests to conservation management.

4.3.2 Forest resource characteristics

Forest resource characteristics such as vegetation type and forest condition are important for making the decision as to whether to harvest or not to harvest timber. The forest resource characteristics of CFUGs in these two districts and their harvest records are given in Table 4.2. The vegetation types in community forests in the two districts are very different. About 45 percent of CFUGs in Rupandehi are plantation, whereas almost no CFUGs in the Udayapur district are plantations. Plantations consist mainly of Sissoo (*Delbergia sissoo*) and Teak (*Tectona grandis*), relatively fast growing species. Natural forests consist mainly of Sal and its companion species, Asna (*Terminalia tomentosa)* and Karma (*Adina cardifolia*). Sal is a slow growing species, and therefore, is not found in plantations. Sal has a high market value, so it is likely, that CFUGs harvest and sell more timber from Sal forests compared to plantations.

Table 4.2 Forest resource characteristics of CFUG in study districts.

Description		Rupandehi		Udayapur	
		Number	%	Number	%
Vegetation type	Natural Forest (NF)	10	17.9	101	65.2
	Natural Forest/Shrub (NF/S)	4	7.1	30	19.3
	Shrub (S)	17	30.4	21	13.6
	Plantation (P)	25	44.6	3	1.9
Forest condition	Very good (VG)	2	3.9	19	12.3
	Good (G)	30	58.8	119	77.3
	Degraded (D)	9	17.7	16	10.4
	Very degraded (VD)	10	19.6	0	0
Timber	Harvesting in 2006/07	35	62.5	125	57.3
	Not-harvesting in 2006/07	21	37.5	93	42.7

Note: Total for each characteristic does not always add up to 274 because of missing data
(Source: Department of Forest CFUG database 2007)

In terms of forest conditions, more degraded forests are located in the Rupandehi district (37.3% of CFUGs), whereas more good forests are concentrated in the Udayapur district (89.6% of CFUGs). The high population density in the Rupandehi district may have caused more forest degradation. One of the common observations was that the government established plantations in these degraded forests and then handed them over to the CFUGs. The number of plantations in the Rupandehi district is very high compared to the Udayapur district.

About 59 percent of community forests in Rupandehi and 77 percent of community forests in Udayapur have been specified as good forests in the CFUG database. Good forest does not necessarily mean the forest has mature and harvestable trees. According to the Community Forest Inventory Guideline of the Department of Forest (2004), young but dense regeneration can also qualify for a good forest (Department of Forestry, 2004).

It is interesting to examine whether there is a relationship between timber harvest and forest condition. Generally, timber is harvested from a good condition forest. The cross tabulation in Table 4.3 of forest condition and timber harvest shows a good relationship. In Rupandehi, the percentage of CFUGs that harvested timber dropped from 100, 83.3, 55.5 and 20 percent across the very good, good, degraded and very degraded forests in respective order. In the Udayapur district, the percentages of CFUGs that harvested timber dropped from 73.7, 55.4 and 40 percent across the very good, good and degraded forests in respective order. This relationship could be stronger, especially in the CFUGs of the Udayapur district, where about 30 percent of data is missing. Further analysis of timber production efficiency in terms of logging costs and key determinants of timber production, will be done in Chapter 5.

Table 4.3 Cross tabulation of forest condition and timber harvest in CFUG.

Forest condition	Total (N)		CFUG harvested (N)		CFUG not harvested (N)	
	Rup	Uda	Rup	Uda	Rup	Uda
Very good	2	19	2	14	0	5
Good	30	119	25	66	5	53
Degraded	9	16	6	6	3	10
Very degraded	10	0	2	0	8	0
Total	*51**	*154**	*35*	*86***	*16*	*68***

(Source: Department of Forest CFUG database 2007)
Note: * Numbers are less than district total (56 in Rupandehi and 218 in Udayapur) because of missing data; ** less than figures mentioned in Table 4.2 due to no tally of forest condition and timber harvest in data source

A considerable portion of CFUGs did not harvest timber, especially in the Udayapur district. About 26 percent of CFUGs with the very good condition forests and about 45 percent with the good condition forests did not harvest timber in the year 2006/07 (Table 4.3). For some, there might be few or no mature trees to harvest. For others, they could have some problems related to organisational capacity such as lack of financial capital, lack of leadership and expiry of the work plan. The organisational capacity related problems of CFUGs for timber production and market sales will be analysed and discussed in Chapter 6.

The topography of the two districts may also play an important role in forest management and harvesting of timber. As Rupandehi lies in the Terai region, this district has more plain area in

the south and a small portion of Siwalik hill in the north. Udayapur lies in the Inner-Terai region that is north of the two Terai districts, Saptari and Siraha. The Udayapur district extends from plain area to Siwalik Hills (small hills) and from valley to high hills. Therefore, compared to Rupandehi, the Udayapur district has more undulating terrain. As a general rule, the plain area is more accessible by road than hills area and therefore, it is easier to harvest timber from the plain area than the hills area.

In summary, the study has been carried out in the Rupandehi and Udayapur districts, which represents the Terai and Inner-Terai regions of Nepal. These regions are different in terms of population density, forest coverage, terrain, and density of community forestry. As a result, these study districts are different to one another in terms of area, population density, forest resource condition and CFUG characteristics. Despite having these differences, community forests of both districts contain Sal forests. Additionally, these districts are good representatives of their respective areas. Thus, these two districts are appropriate for this study.

The Rupandehi district has less forest resources and higher population density, whereas the Udayapur district has more forest resources and less population density. These differences have been reflected in the characteristics of CFUGs of the two districts. CFUGs in Rupandehi have a large number of households with small forests, resulting in a small forest endowment per HH, whereas CFUGs in Udayapur have a small number of households with medium size forests, resulting in a higher forest endowment per HH. Secondly, community forests in Rupandehi are more likely to be plantations and/or degraded, and community forests in Udayapur are likely to be natural Sal forests and in good condition. There is a positive relationship between forest condition and timber harvest. Based on this relationship, it is expected that CFUGs in Udayapur might produce more timber and be more involved in market sales than CFUGs in Rupandehi.

4.3 Sample description

The sample for this study consists of 99 CFUGs (22 from the Rupandehi district and 77 from the Udayapur district), which were selected randomly from 274 CFUGs. Fifteen out of 22 sample CFUGs harvested timber in Rupandehi and 62 out of 77 sample CFUGs in Udayapur harvested timber in the year 2006/07. The rest of the CFUGs did not harvest timber in this year. Data of the other two earlier years (2005/06 and 2004/05) were available in only few CFUGs, therefore, analysis has not been carried out for these years.

The primary aim of this section is to give a general description of the sample CFUGs. This will give an idea of how well the sample represents the district. A well-represented sample will result in a stronger generalisation ability in the total population. Characteristics of these sample CFUGs and their forest resources are analysed and presented below in two subsections. The sample statistics are also compared with the district level statistics in order to check their representativeness.

4.3.1 Characteristics of sample CFUGs

The characteristics of the sample CFUGs are analysed and presented in the same way as for the district. The characteristics include HH numbers, forest area, forest endowment per HH and year of operation. The characteristics of the sample CFUGs are given in Table 4.4.

Table 4.4 Summary of sample CFUGs (N = 99).

Characteristics	Unit	Rupandehi district (N)				Udayapur district (N)			
		Min	Max	Mean	Med	Min	Max	Mean	Med
Household	No.	19	6500	1216	445	26	848	217	169
Forest area	ha	1.47	1558	212	78	4.6	824	268	240
Forest endomt.	ha/HH	0.02	0.68	0.21	0.14	0.17	4.82	1.5	1.3
Operation	Year	2	14	6.5	5	1	14	5.8	4

Source: District Forest Office and Department of Forest 2008.

As shown in Table 4.4, the characteristics of sample CFUGs in Rupandehi are poor in terms of forest resources, and CFUGs in Udayapur are better off. For example in Rupandehi, the mean number of households and forest area are 1216 and 212 ha respectively resulting in a very small forest endowment of 0.21 ha per household (ha/HH), almost exactly the same as the district level mean of 0.21 ha/HH (Table 4.1). In contrast, in Udayapur, the sample CFUGs have a mean of 217 HH and a mean forest area of 268 ha, resulting in a higher forest endowment of 1.5 ha/HH. This forest endowment is the same as the district level mean of 1.51 ha/HH. In the case of operation years, in the Rupandehi district, the mean of the sample CFUGs is 6.5 years, which is slightly less than the district level mean of 7.5 years. In the Udayapur district, the sample mean years of operation (5.8 years) is almost the same as the district mean level (5.9 years).

A breakdown of households, forest area, forest endowment and operating years compared with the districts level statistics are shown in Figure 4.6, 4.7, 4.8 and 4.9. Distributions of households in each CFUG are shown in Figure 4.6. Overall, the sample distribution of households is similar to the district level distribution. The sample representation in the Udayapur district is better than for the Rupandehi district. In Rupandehi, the sample does not

include some categories of CFUG sizes. However, this should not be an issue because there are only a few CFUGs in these sizes at the district level data as well.

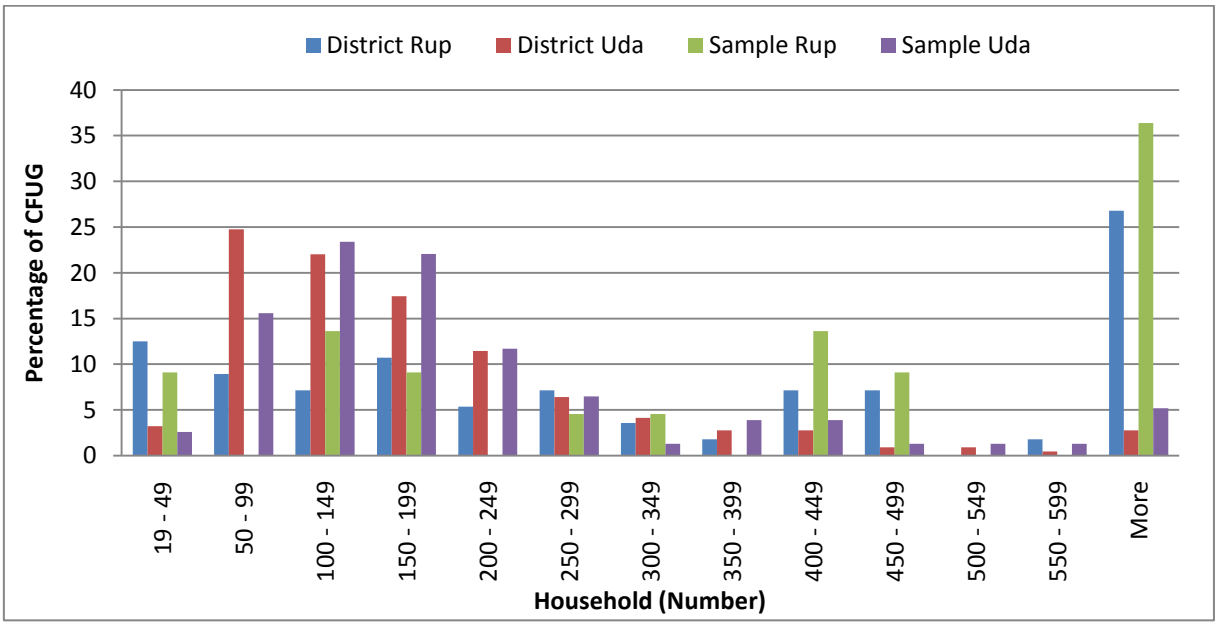


Figure 4.6 Distribution of CFUG by household in District and sample.

In the case of the distribution of CFUGs by community forest area, the distribution in the sample is similar to the districts across all categories of community forest areas (Figure 4.7).

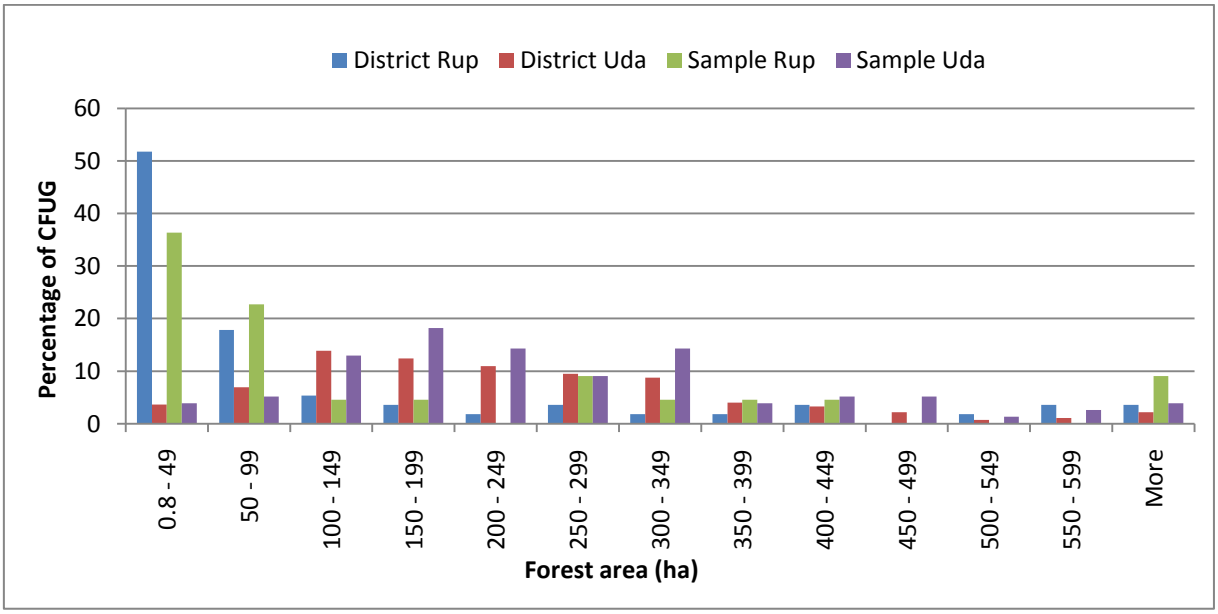


Figure 4.7 Distribution of CFUG by community forest area in District and sample.

In the case of forest endowment, the sample distribution is similar to both district level distributions (Figure 4.8).

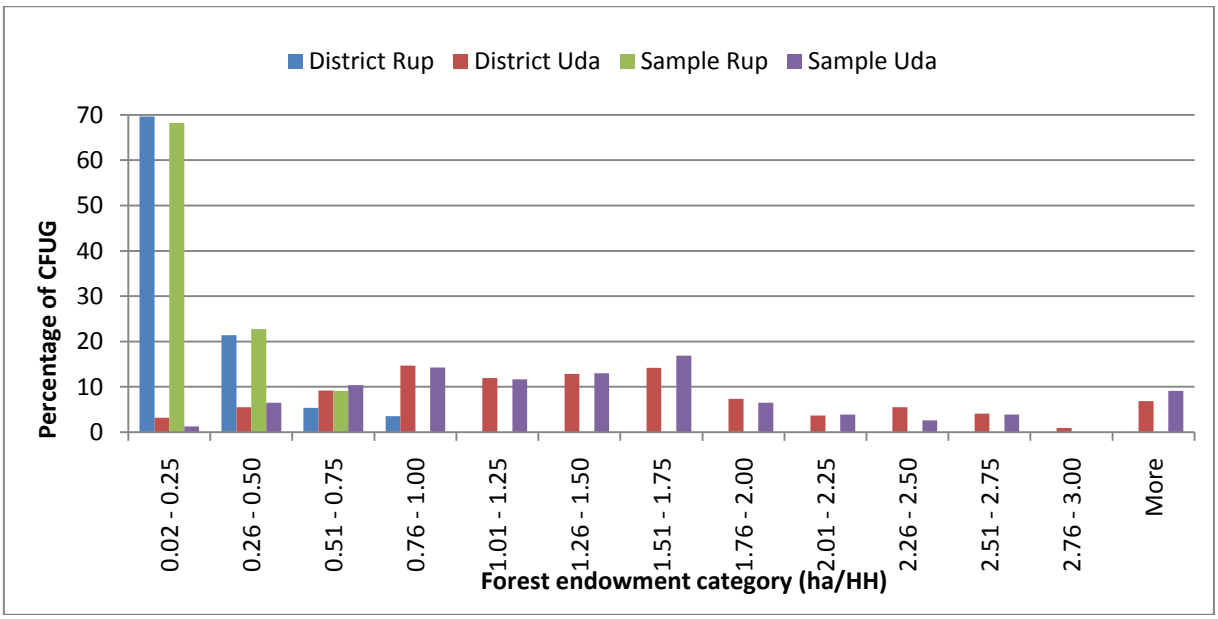


Figure 4.8 Dsitribution of CFUG by forest endowment in District and sample.

Finally, in the case of forest handover year, the sample distribution is mixed (Figure 4.9). In the Udayapur district, the sample distribution is similar to the district level data. However, in the Rupandehi district, the sample distribution is slightly different to the district level distribution. Representation of the samples in the years 2003/04, 2001/02 and 1993/94 are higher than the district level percentages in these years. On the other hand, representation of the samples were nil in the years 2000/01, 1992/93 and before 1992/93.

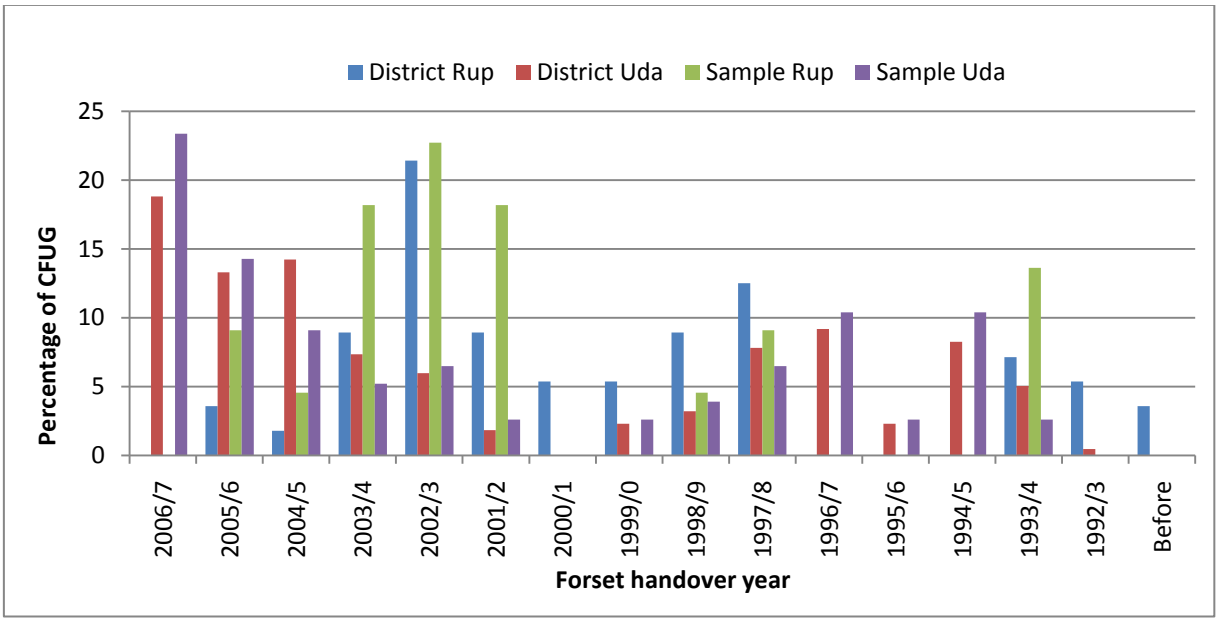


Figure 4.9 Distribution of CFUG by forest handover year in District and sample.

Thus, general characteristics of the sample CFUGs are very similar to the characteristics of districts in the study areas. In general, sample CFUGs in the Rupandehi district have a large number of households with a small forest. Sample CFUGs in the Udayapur district have a small number of households with a large forest. As a result, sample CFUGs in the Rupandehi district have a small forest endowment per HH. Sample CFUGs in the Udayapur district have a higher forest endowment per HH. In the case of the forest handover, the sample distribution is similar to the district level distribution in the Udayapur district, but slightly different in the Rupandehi district.

4.4.2 Forest resource characteristics of sample CFUGs

In this subsection, forest resource characteristics of 99 sample CFUGs are presented and compared with the characteristics of district level CFUGs. The forest resource characteristics and the harvest record of the sample CFUGs of the two districts are given in Table 4.5. The vegetation types of the sample CFUGs are very similar to the district types, particularly in the Udayapur district. For example, percentages of NF, NF/S, S and P in the sample CFUGs are 60.4 percent, 22.9 percent, 14.6 percent and 2.1 percent respectively, while percentages of these vegetation types in the district level data are about 65 percent, 19 percent, 14 percent and 2 percent respectively (Table 4.2). In the case of the Rupandehi district however, vegetation types of the sample CFUGs are over representative in the case of NF and NF/S, but less representative in the case of S and P compared to the district level percentages.

Table 4.5 Forest resource characteristics of sample CFUGs (N = 99).

Description		Rupandehi*		Udayapur*	
		Number	%	Number	%
Vegetation type	Natural Forest (NF)	7	31.8	29	60.4
	Natural Forest/Shrub (NF/S)	4	18.2	11	22.9
	Shrub (S)	4	18.2	7	14.6
	Plantation (P)	7	31.8	1	2.1
Forest condition	Very good (VG)	2	10	5	10.6
	Good (G)	13	65	34	72.3
	Degraded (D)	3	15	8	17.1
	Very degraded (VD)	2	10	0	0
Timber	Harvested	15	68.2	62	80.5
	Not harvested	7	31.8	15	19.5

Note: * Total of each characteristics does not always add up to district total (22 in Rupandehi and 77 in Udayapur) because of missing data.
Source: Department of Forest CFUG database 2007

In terms of forest condition, the sample CFUGs are very similar to the district level CFUGs in terms of percentages. The forest condition of the sample CFUGs in both districts is mainly

good (G). The G of the sample CFUGs accounts for 65 percent and 72 percent in the Rupandehi and Udayapur districts respectively. The percentages of G in the district level CFUGs are 59 and 77 percent in the Rupandehi and Udayapur districts respectively. The other forest condition types of the sample CFUGs also are similar to the respective district level percentages.

Finally, in terms of timber harvested and not harvested in CFUGs, percentages of the sample CFUGs in Rupandehi are similar to the district level figures. In Rupandehi, the percentages of the sample CFUGs that harvested and did not harvest timber are about 68 and 32 percent respectively. The figures for the district level CFUGs in Rupandehi are about 53 and 38 percent (Table 4.2). In Udayapur district however, the sample CFUGs that harvested timber are slightly over represented compared to the district level data. The timber harvested group accounted for 80.5 percent of the sample CFUGs, compared to 57 percent of the district level data.

Overall, the sample CFUGs are similar to the district level CFUGs in forest resource characteristics. Distribution of forest conditions in the sample CFUGs is similar to the district. Distribution of vegetation types and timber harvested and not harvested in the sample CFUGs was mainly similar with the district level characteristics.

4.4 Summary

The study has been carried out in the Rupandehi and Udayapur districts, which represents the Terai and Inner-Terai regions of Nepal. Both regions have extensive Sal forests. These study districts are different to one another in terms of area, population, forest resource, and CFUG characteristics including community forests. However, these districts are good representatives with the districts of their respective regions.

In order to provide the district level descriptive analysis and the CFUG characteristics, 274 CFUGs are used. Firstly, the Rupandehi district is characterised as having less forest resources and a higher population density, whereas the Udayapur district is better off in forest resources and a lower population density. As a result, community forestry characteristics are different in the two districts. CFUGs in the Rupandehi district have a large number of households and a small forest, resulting in low forest endowment per household, whereas CFUGs in the Udayapur district have almost exactly the opposite. Secondly, community forests in Rupandehi are more likely to be plantations and degraded, whereas community forests in Udayapur are likely to be natural Sal forests and in good condition. There is a positive relationship between forest condition and timber harvest. Based on this relationship,

it is expected that CFUGs in Udayapur might have produced more timber and been involved in the timber business more, than CFUGs in Rupandehi. Further analysis of timber production efficiency is done in Chapter 5 next.

The descriptive analysis of 99 sample CFUGs is given and their representativeness is compared with the district level statistics. The sample CFUGs are similar to the district level CFUGs in terms of group characteristics and forest resource characteristics. Therefore, inferences drawn from the sample have high generalising ability in the community forests of the Terai and Inner-Terai regions of Nepal.

Chapter 5
Timber Production Efficiency

5.1 Introduction

Chapter 4 described the characteristics of the study area and compared the district level characteristics with the sample. The first research objective of this study was to examine whether the size of a community forest affects timber production efficiency. Community forests are often small and scattered and logging might be more costly and less profitable in small forests.

The initial objective was to use the Cobb-Douglas production and cost functions to study efficiency of logging. However, these functions could not be estimated for two reasons. Firstly, the production system used in the study area was on a piece rate basis, depending on the location of community forests and specific site conditions (e.g. plain versus hill, tractorable versus non-tractorable road), rather than paying labourers on an hourly or daily wage basis. Secondly, most of the logging was done with the involvement of contractors. The contractors managed and paid the logging labourers instead of the CFUG. This meant that a breakdown of logging costs was not able to be obtained from CFUG or DFO records.

Instead of estimating production and cost functions, this chapter focuses on analysing factors related to costs and efficiency for which data was available. For example, factors such as forest area, growing stock and annual allowable cut (AAC), species composition, logging costs, size of harvest, and revenue, may be related to the amount of harvest and market sales of timber, and are analysed in this chapter. The general characteristics of timber production and sales are described in Section 5.2. In Section 5.3, timber production costs are analysed. In Section 5.4, key determinants of timber production are examined. Finally, in Section 5.5, a summary of the chapter is drawn.

The CFUGs of the Rupandehi district are not included in this part of the analysis. The primary reason for this is that the CFUGs in the Rupandehi district are not harvesting green trees. This is apparently because the DFO does not allow the harvest of green trees. CFUGs in this district are allowed to harvest only dead, dying and diseased trees, which is not relevant to this study. In addition, about half of the 56 CFUGs are plantations of species other than Sal. Only one CFUG in the district sold timber to the market in 2006/07. The rest only sold timber internally to their own members.

5.2 Characteristics of timber production and sale

The aim of this section is to describe the general characteristics of timber production by the Udayapur CFUGs. This includes the nature of logging, size and distribution of annual harvest, and the proportion of external versus internal sales. For logging, CFUGs use manual labour and basic tools such as cross-cutting saws, axes, wedges and levers. For the transportation of timber, CFUGs mostly use tractors on flat terrain and gentle hill slopes, and occasionally bullock carts. In steep hill forests, CFUGs use manual labourers to transport timber to the tractor/truck road head, either in the form of whole logs or after converting logs to smaller planks in the forest.

Most of the CFUGs in the Udayapur district harvested timber through contractors, especially where logging was intended for market sales[3]. However, this logging was shown on paper as having been done by the CFUGs themselves. The prime reason for this difference between paper and practice is believed to be the policy constraint for contracting – CFUGs are supposed to conduct all forestry activities themselves; they are not allowed to contract out. The potentials and constraints of contracting between CFUGs and private firms are analysed in Chapter 7. So, the usual practice on paper was that the logging costs were the costs of the CFUGs until the auction sale. Once the sale was completed, the logging costs were shown as being reimbursed by the log buyer. Because of this, arbitration records about which CFUGs did the logging themselves and which logged by using contractors, was not available in the DFO for the year 2006/07.

All 62 CFUGs of Udayapur district are included in the analysis of timber production. As mentioned above, only timber production from the green or standing trees is of interest to this study. Thirty nine CFUGs harvested only green trees and the rest (23 CFUGs) harvested both green and dead or fallen trees. The log volume from only the green trees from the 23 CFUGs was used in the analysis and volumes from dead logs from these 23 CFUGs were excluded. The mean annual allowable cut (AAC) and annual harvest (AH) of timber of the CFUGs is given in Table 5.1.

Table 5.1 shows that firstly, the mean annual harvest of timber was a small amount, 50 m3 and secondly, the mean annual harvest of timber was only 66 percent of the mean AAC. In principle, CFUGs can harvest 100 percent of their AAC. Furthermore, the variation between the minimum and maximum volume of AAC and the annual harvest of timber in CFUGs is very high.

[3] Personal communication with a DFO staff and NGO staff in January 2008.

Table 5.1 Mean AAC and annual harvest in Udayapur sample CFUG (N = 62).

Details	AAC (m3)	Annual Harvest (m3)	% of AAC harvested
Mean	76.0	50.0	65.7
Minimum	2.9	2.3	79.3
Maximum	246.6	161.0	65.3
Standard deviation	44.6	31.7	-

How the annual harvest of timber was distributed across the AAC is given in Figure 5.1. This Figure shows only about 20% of the CFUGs harvested 100 percent of their AAC. The other, about 80% of the CFUGs, harvested less than what they could have harvested. Also, about 20% of the CFUGs harvested only 50 percent or less of their AAC.

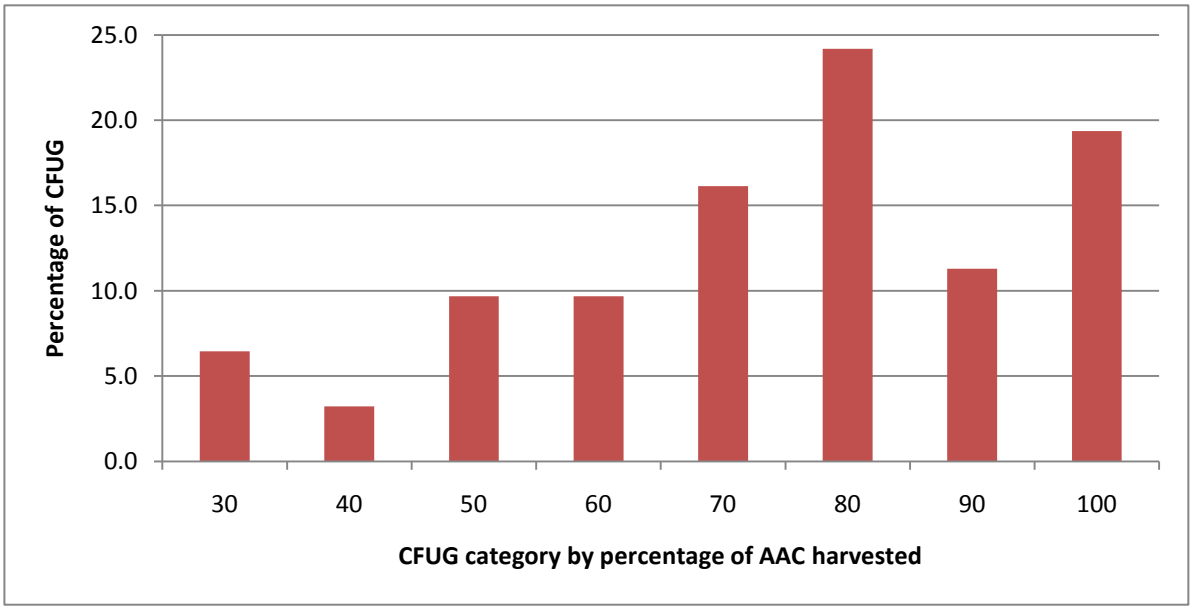


Figure 5.1 Distribution of CFUG by percentage of AAC harvest (N=62).

For harvests that were less than their AAC, factors such as species, topography, logging costs and organisational capacity might have been involved. Species composition of the average AAC and annual harvest is given in Table 5.2. This Table clearly shows that the main focus of timber production in the CFUGs was Sal. For example, 83 percent of the average annual harvest was composed of Sal timber although it was only 66 percent of the AAC. The remaining 17 percent of the average annual harvest was composed of other species (non-Sal).

Table 5.2 Species composition of average AAC and annual harvest (N = 62).

Species	Annual Allowable Cut (AAC)		Annual harvest	
	m3	%	m3	%
Sal	50.3	66.2	41.7	82.9
Non-Sal	25.7	33.8	8.3	17.1
Total	*76.0*	*100*	*50.0*	*100*

In many CFUGs, all the AAC of Sal had been harvested. On the other hand, little of the AAC of non-Sal species had been used in the annual harvest, despite this category comprising about 34 percent of the AAC. One of the potential reasons for this low harvest of non-Sal species was that they have no market. Only two species Asna (*Terminalia tometosa*) and Karma (*Adiena cardifolia*) of the non-Sal species were found to be harvested. The remaining other species probably have no market value despite being included in the AAC of work plan.

The average amount of market sales and internal sales of timber, is given in Table 5.3. A considerable proportion (76 %) of the annual harvest is sold to the market compared to internal sales (24%). Looking at the average size of a CFUG (223 households), the average amount of internal sales of timber is quite low (0.05 m3 per household). One of the possible reasons for this was that dead and fallen trees might have been sold internally and therefore not included in the analysis.

Table 5.3 Average market sale and internal sale of timber in CFUG (N = 62).

Details	Market sale		Internal sale	
	m3	%	m3	%
Average total sales of timber	38.0	76.0	12.0	24.0
Minimum	7.0		1.6	
Maximum	156.6		88.8	
Average sales of Sal	31.1	74.6	-10.6	25.4
Average sales of the other species	7.8	93.9	0.5	6.1

In addition, the minimum size of a market sale is about 7 cubic metres which is about a truck load. This makes sense in that log buyers are happy to come to a CFUG if the amount is at least a truckload of timber (Table 5.3). In contrast, for the internal sales, CFUGs can harvest and sell internally, as small an amount as 1.6 cubic metres – equivalent to felling a small tree. Finally, it is clear that the non-Sal timber has no internal demand. For example, only 6 percent of the timber of the average annual harvest (8.3 m3) has been sold internally.

From the above discussion, one of the potential reasons for harvesting a low percentage of the AAC, was no market for non-Sal timber. In the case of Sal timber however, the potential reasons for a low percentage harvest of the AAC in about half of the CFUGs (Figure 5.1)

might be some issues related to organisational capacity of a CFUG and institutional barriers for vertical integration with the market. These issues will be analysed in Chapter 6 and Chapter 7.

In summary, logging in community forests was found to be done using intensive manual labour and traditional tools. In the 62 CFUGs of the Udayapur district that were sampled, the annual harvest was only 66% of the total AAC. The mean annual harvest was a small amount, 50 cubic metres. To sell to the market, the minimum size appears to be about a truck load of timber (7 m3). For internal sales however, a very small amount of timber can be harvested. There may be some reasons for not harvesting the full AAC of community forests. One reason seemed to be the CFUGs preference for Sal species because of the potentially high market value. The non-Sal species harvested was found to be only about 33% of the AAC. Internal demand for non-Sal species timber was almost zero. In addition to the market value, there might be some issues related to organisational capacity of a CFUG and institutional barriers for the low percentage harvest of the AAC.

5.3 Timber production cost

The aim of this section is to analyse the effects of size or scale on (a) logging cost, (b) revenue, and (c) net cost to log buyers. Logging costs include tree felling, cross cutting, hauling, loading, transportation, debarking at the middle of each log for measurement of the girth, and piling based on the species and the size. Logging costs include all costs from making logs in the forest to making them ready for sale at the depot. Therefore, in Nepal, logging cost is commonly called as "collection cost" of timber. In the Nepalese system, the logging cost is based on a piece rate – fixed Rupees per cubic foot of logs, prepared and transported to the selling depot.

Similarly, in general, revenue is the profit earned by a firm from selling a product after deducting all associated costs. In the case of CFUGs, income from log sales, which is mainly from market sales, is considered as revenue. Generally, in timber sales from government forests, the logging cost is borne by the log buyer. Therefore, the net cost to log buyers includes the price of logs as well as the logging costs.

This section begins with an analysis of whether there is a size effect on logging costs followed by an analysis of the effect of size on net revenue to CFUGs and net cost to log buyers. Finally, this section focuses on examining the determinants of timber production (subsection 5.3.4).

5.3.1 Logging cost

In theory, in capital or specialised labour based logging, the average logging cost will fall with an increase in the amount of harvest, until a certain point. Then, the average logging cost will rise again because of a crowd of labourers or mismanagement of resources. However, logging in CFUGs is not capital based but is rather manual labour intensive.

This section uses the logging costs of only 51 CFUGs out of the 62 from the previous section. In the 11 CFUGs that could not be used, 7 CFUGs sold the timber internally only. Their logging costs were borne by their own members so the cost either was not recorded or members did the logging themselves. In three CFUGs that had no road access to the forest, logs were sawn into smaller planks then carried manually to the road head or CFUG. Therefore, the logging costs of these CFUGs cannot be compared to the other CFUGs. In another case, the CFUG confiscated timber from timber poachers and showed this timber in their annual harvest figures. Thus, this CFUG did not have the full logging costs.

In most of the remaining 51 CFUGs, log buying contractors were involved in logging and paid labourers directly. The labourers were not paid by the CFUG Executive Committee. Contractors used a piece rate of Rupees per cubic foot of log. The piece rate payment system was found not only in community forests where contractors were involved, but also in CFUGs that harvested timber without contractors. The distribution of average logging costs in each CFUG is shown in Figure 5.2.

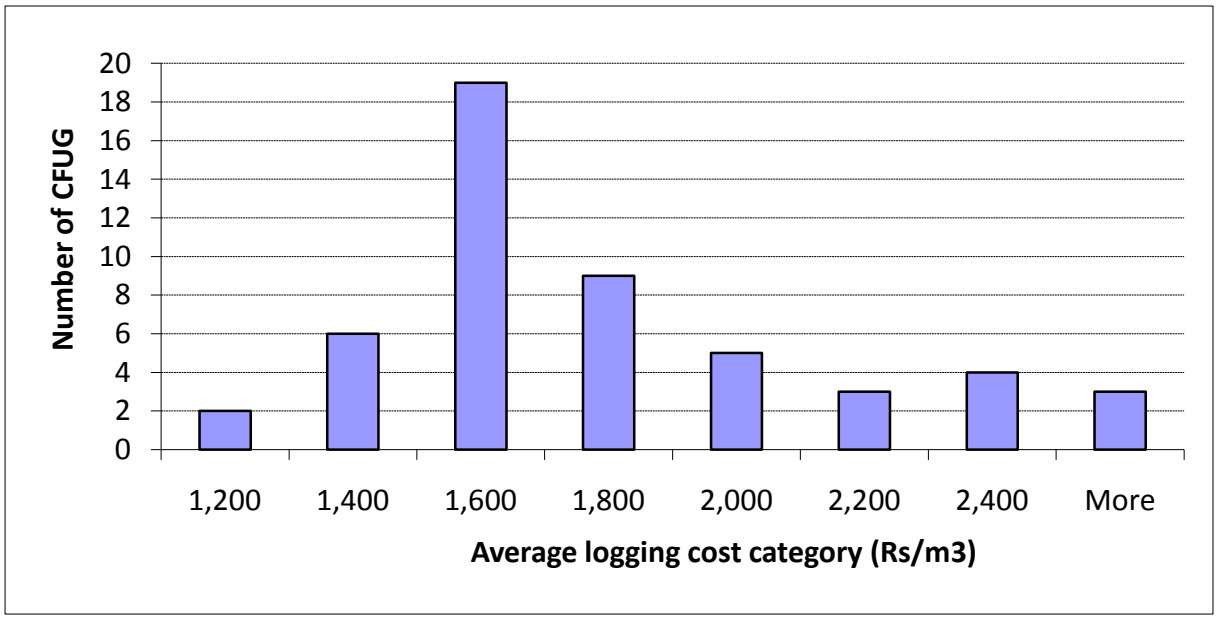


Figure 5.2 Distribution of CFUG by logging cost (N = 51).

Figure 5.2 shows that the average per cubic metre logging costs, of each CFUG, varies greatly from about Rs1200 to more than Rs2400. However, the majority, 28 out of 51, of the CFUGs' average logging costs fall between the Rs1600 to Rs1800 categories. The frequencies of the smallest (Rs1200) and the largest (more than Rs2400) average logging cost categories are two and three respectively.

It was found that the average logging cost generally depended on topography or location of forests. Locations of the community forests are sorted into three categories: Plain, Hill 1, and Hill 2. The Plain is relatively easy for logging, whereas the hills are difficult locations for logging. Hill 1 is small and gentle slope hills, where a road is not far from the forest. Hill 2 is bigger hills with steeper slopes and where a road is not that close. The average logging cost per cubic metre on the Plain, on Hill 1 and on Hill 2 is given in Figure 5.3.The average logging costs in the Plain, Hill 1 and Hill 2 areas are about Rs1300, Rs1650 and Rs 2200 per cubic metre respectively. As mentioned at the beginning of Section 5.3, the logging costs cover a range of activities, including felling, cross-cutting, hauling, transporting from forest to the selling depot, debarking and piling according to size. For this study, there was no way to separate these costs. In essence, the logging cost is the delivered or c.i.f. cost. According to the researcher's personal experience, the main factor causing variation in average logging cost is the transportation cost from the community forest to the log-selling depot.

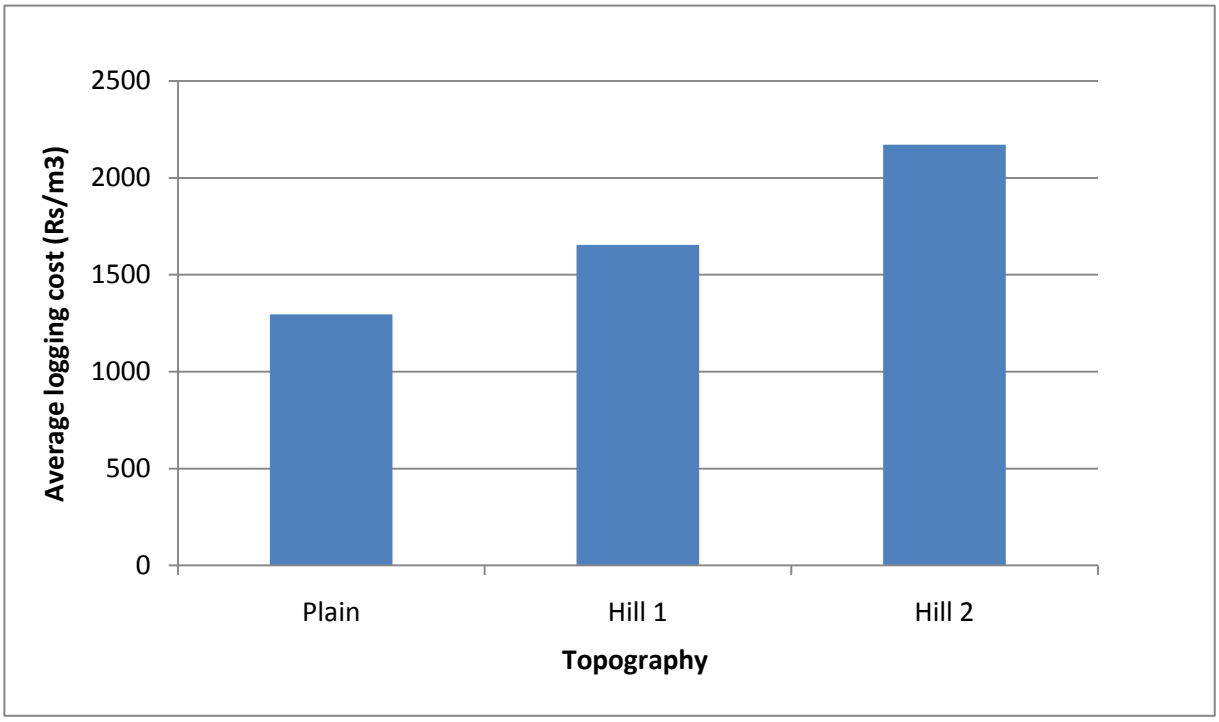


Figure 5.3 Average logging cost by topography of forest.

Next, it is interesting to examine whether the size of the annual harvests has an effect on logging cost. For this, logging cost and annual harvest by location, is shown in Figure 5.4.

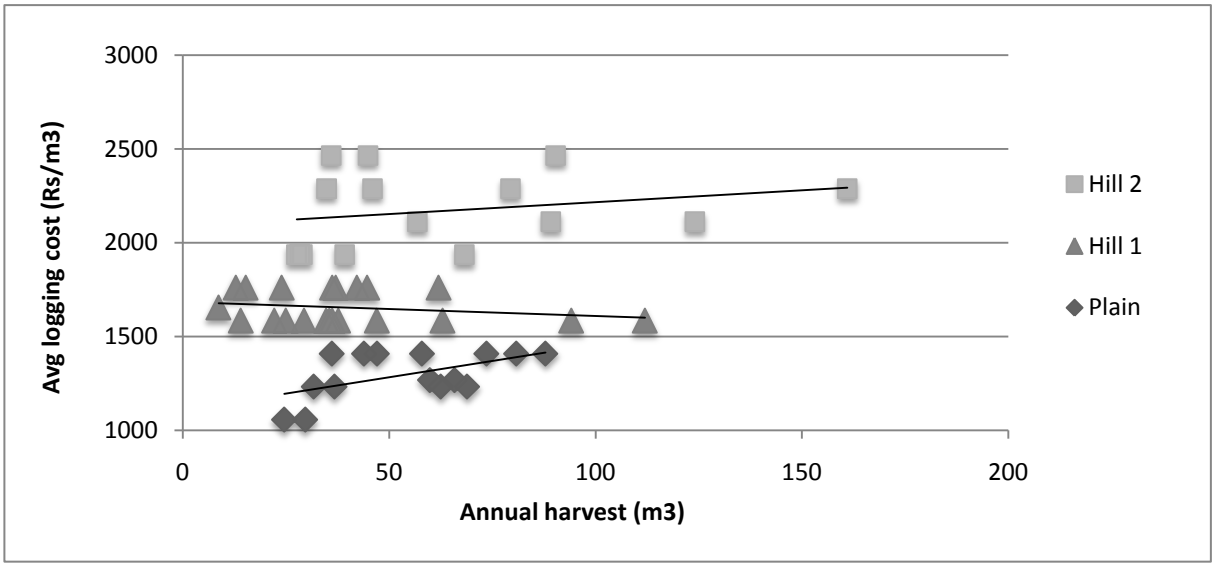


Figure 5.4 Effect of annual harvest volume on logging cost by location.

Figure 5.4 clearly shows that the annual harvest volume has no effect on logging cost. The presence of scale economies would suggest that logging costs should lower as the annual harvest volume increases, but that is not the case in any location.

In summary, in most of the cases, contractors were involved in logging instead of CFUG Committees, and a piece rate payment system was always used. The piece rate is based on the topography and road accessibility. The average cost of logging increased from the Plain to Hill 1 and from Hill 1 to Hill 2. There is no effect of annual harvest volume on the logging cost.

5.3.2 Sal timber revenue from market sales

Generally, a CFUG gets revenue by selling logs to the market (external sale) and to their own members (internal sale). However, since non-Sal timber consists of only about 15 percent of the average annual harvest, and the market sale price of the non-Sal timber is considerably lower than the market sale price for Sal timber, and the internal sale price of Sal timber is subsidised for CFUG members, only revenue from the Sal market sale is taken into consideration.

Net revenue is normally the final revenue (or profit) remaining after deducting costs. Costs include logging, transport and management. However, for CFUGs, log revenue is the net

revenue. There are two reasons for this. Firstly, most of the logging in CFUGs was done by contractors who not only employed the labourers, but also paid them. In these cases, the logging cost was the contractors cost, not the CFUG Committee's cost. Generally, the logging contractors bought the logs later through auction. In practice, it seemed to be close to a 'stumpage sale' of trees from community forests. However, in theory and thus on paper, CFUGs are allowed to sell logs only through the auction process once the logs are ready at the selling depot, and with the DFO's permit. Secondly, even where the CFUG Committee has hired and paid the logging labourers, which was few but not known exact number in this study, the Committee's logging costs were refunded by log buyers, once the auction was completed. This is a standard system in Nepal and also applied to the government and Timber Corporation of Nepal (TCN) auction sales.

The management cost was not deducted from the revenue, primarily because there was difficulty in determining management costs as they were not recorded. If they were recorded, they were usually lumped in with other costs. For example, the management cost included all allowances to executive members, general members and Rangers and Forest Guards, for involvement in thinning or bush clearing activities. Many of these activities are not directly related to the logging and market sales of logs. In addition, in most of the cases, the CFUGs' executive members were involved in management voluntarily, which means a little or no management costs. Thus, the revenue from market sales of Sal logs is considered to be the net revenue of the CFUG. The revenue from market sales is the market sale price of Sal logs. The distribution of net revenue per cubic metre of Sal logs in CFUGs, using the market price is illustrated in Figure 5.5.

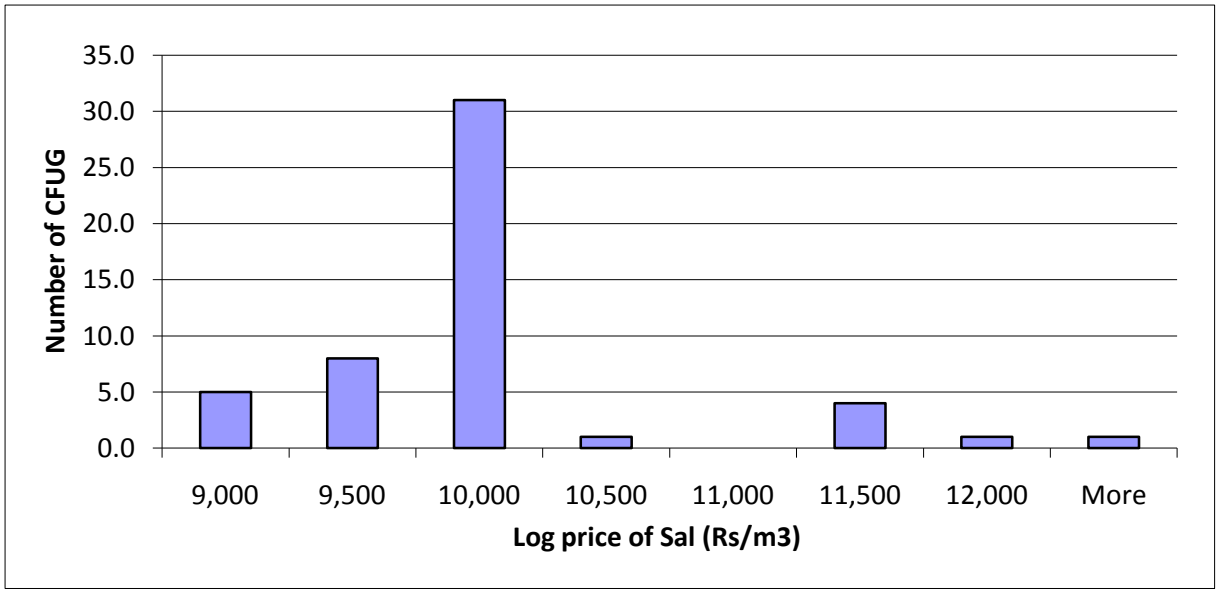


Figure 5.5 Distribution of CFUG by net revenue using market price of Sal log.

Most of the CFUGs have too low a net revenue. Eighty five percent of the CFUG's net revenue falls in between Rs9,000 to Rs10,000 per cubic metre. The main reason for this is that most of the CFUGs sold their timber for a similar price. For example, 60% of the CFUGs' market sales are Rs10,000 per cubic metre. One CFUG that had more than Rs12,000 per cubic metre in net revenue, harvested the timber themselves instead of borrowing money from a contractor.

The effect of size of market sales, on the price, is given in Figure 5.6. This Figure clearly shows that there is no effect from sales volume on price. The log price is almost constant across sales volumes. For example, the smallest and the largest amount of market sales' volumes had a similar price of about Rs9000 per cubic metre. One CFUG that sold only about 30 cubic metres of Sal logs had the highest price of about Rs15,000 per cubic metre, because this CFUG harvested timber on their own and had a competitive auction sale. Thus, volume of market sales had no effect on the price received by the CFUGs.

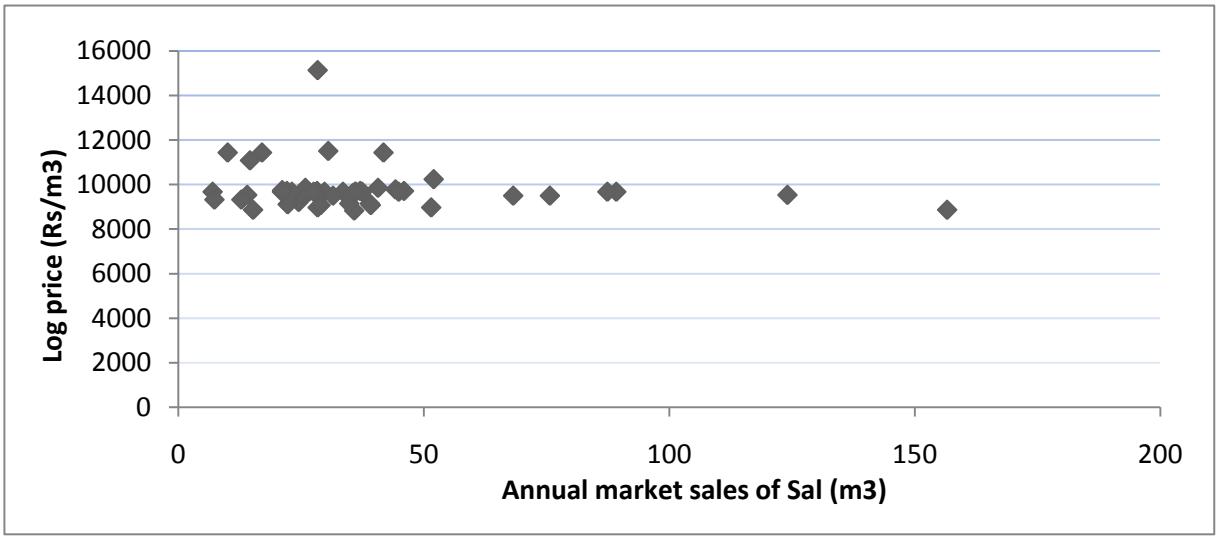


Figure 5.6 Effect of volume of market sales on price by CFUG (N = 51).

These above findings – the uniform and low price of logs, and no effect from volume of market sales on the price, the CFUG that harvested logs on its own received the highest log price – indicate that there might be less competitive auction sales, because of the probable high influence of the log buying contractors' pre-investment in logging. Additionally, there might be some other problems related to organisational capacity and also, corruption. These problems will be analysed in Chapter 6 and Chapter 7.

In summary, revenue from selling Sal logs to the market is found to be the net revenue of CFUGs because of a little management costs and reimbursement of logging costs from the log-buyer. The net revenue based on the market price is found to be low and uniform in most of the CFUGs because of low and uniform sales prices. The volume of market sales has no effect on the sales price received by a CFUG.

5.3.3 Net cost to log buyers

As mentioned above, the logging cost is always borne by the log buyers. Therefore, the net cost to a log buyer is the purchase price of the logs plus the logging costs. Figure 5.7 shows the net cost to the log buyers for each CFUG, based on the size of their market sales. Figure 5.7 also clearly shows that there is no effect from sales volume on the net cost to the log buyers. For almost all buyers, from less than 10 cubic metres to 160 cubic metres, net costs were between Rs10,000 and Rs12,000 per cubic metre. The prime reason for this was that the purchasing price was very much uniform and not based on the volume of purchase. An exception is where the net costs of buying about 30 cubic metres of logs from one particular CFUG was more than Rs16,000 per cubic metre because of the high purchasing price (about Rs15,000/m3).

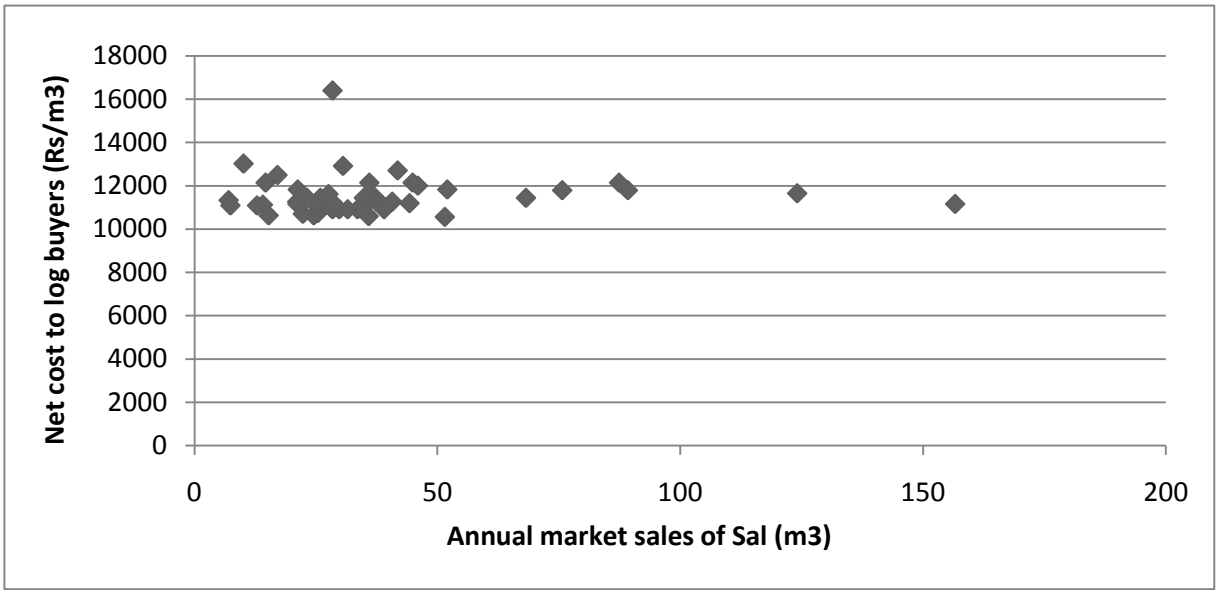


Figure 5.7 Effect of market sales volume on net cost.

In summary, in most of the cases, contractors were involved in logging and a piece rate payment system was always used. The piece rate was based on the locations of the forests and road accessibility. Therefore, there was no effect from volume of harvest on the logging cost. Revenue from market sales of Sal logs was the net revenue to the CFUGs, because of the

logging costs always being borne by the log buyers and because of little management costs. The net revenue of most of the CFUGs was low and uniform, because of low and uniform sales price. The volume of market sales had no effect on the sales price received by the CFUGs. The net cost to log buyers was the purchase price of logs plus the logging costs. Also, the market sales volume had no effect on the net cost to log buyers. One of the potential reasons for the low and uniform price of Sal logs across the CFUGs was possibly the less competitive auction sales system, due to the influence of pre-investment by the log buyers, in logging.

5.4 Key determinants of Sal timber production

From the previous section, it is evident that Sal timber production is profitable to a CFUG. There is no effect of scale in terms of annual volumes, on logging cost, log price or net costs to buyers, since these factors do not affect returns to logging volumes. It is interesting to examine what actually determines the quantity of annual harvest of Sal (AHsal) in community forests.

A multiple regressions using ordinary least square (OLS) were used to determine the relationship between the AHsal and a range of input factors such as; forest area (FA), growing stock (GS), growing stock of Sal (GSsal) logging labour, the geographical location of the forest as a dummy variable, and road accessibility as a dummy variable. The OLS result is given below.

$AHsal_i = 4.9403 + 0.1688GSsal_i + 0.0742FA_i$

Se	(9.6475)	(0.0605)	(0.0214)
t	(0.5120)	(2.7887)	(3.4541)

r2 = 0.2196 d. f. = 60

Where,
$AHsal_i$ = Annual harvest of Sal (m^3)
$GSsal_i$ = Growing stock of Sal (m^3/ha)
FA_i = Forest area (ha)

The OLS result shows that the growing stock of Sal (GSsal) and forest area (FA_i) are statistically significant at the 5% significance level in determining AHsal. So, the regression result can be interpreted as the annual harvest of Sal could be increased by 0.1688 cubic metres by adding a cubic metre of GSsal and keeping the forest area constant. Similarly, the annual harvest could be increased by 0.0742 cubic metres by adding a hectare to the forest area and keeping the GSsal constant. Thus, the annual harvest of Sal can be increased by increasing both the GSsal and the forest area. The relationships between AHsal and the other variables were insignificant.

An important factor to note is that the OLS result shows that these two variables explain only about 20 percent (t = 0.2196) of the variability in the annual harvest of Sal. About 80 percent of the variability in the annual harvest of Sal is thus not captured in the regression. The organisational capacity of CFUGs and the institutional barriers for contracting and cooperative arrangements of CFUGs might instead be more important in determining the annual harvest of Sal timber. These factors are analysed in Chapter 6 and Chapter 7.

5.5 Summary of Chapter

In this chapter the timber production efficiency in community forests in the Rupandehi and Udayapur districts is examined. In the former district the timber production is found to be constrained by the DFO. Therefore, analysis of timber production is carried out only in community forests of Udayapur districts. The initial proposed Cobb-Douglas production and cost functions could not be estimated, because of the production system and the contract payment arrangement.

On average, only 66% of the AAC was found to be harvested in community forests. One reason for this appeared to be the preference for Sal over non-Sal species. The minimum volume of market sales was found to be 12 cubic metres, equivalent to one truckload of timber. For internal sales however, it was found that any amount of timber was harvested. The effect of size in terms of annual harvest volume, on average logging costs, was examined in order to investigate whether there were economies of scale. There appeared no scale economies in logging in community forests. The main variations in average logging costs are believed to be due to the transportation cost from forest to log-selling depot. This is illustrated by the average contracting logging cost being less on the Plain which is closer to log-selling depots than in Hill 1 and Hill 2.

Likewise, in terms of the log price and the net cost to buyers, there appeared no scale effects as well. This result indicates that logging is largely equally profitable for all sizes of community forests. Despite the profitability of logging, not all CFUGs were found involved in logging and market sales. There also appeared some variability in the log price received by some of the CFUGs, despite having a similar size of harvest and similar logging costs. This indicates that there might be institutional issues affecting logging returns. These issues will be discussed in Chapter 6.

Finally, the determining factors for the annual production of Sal timber in community forests were tested with a range of potential input factors. These factors included; forest area, growing stock of Sal, logging labour, the geographical location of the forest as a dummy variable, and road accessibility as a dummy variable. The significant factors for annual harvest of Sal were found to be the growing stock of Sal (GSsal) and forest area (FA).

Chapter 6
Institutional Analysis: Organisational Capacity

6.1 Introduction

The previous chapter analysed the effect of size on logging costs, revenues to CFUGs and net costs to the log buyers, and the key factors determining the annual harvest from community forests. The second research objective of this study is to investigate whether the organisational capacity of a CFUG creates problems for timber production and market sales. The aim of this chapter is to analyse the organisational capacity of CFUGs in arranging logging and market sales, either in the form of logs or sawn wood, by considering them as a social firm. As described in Chapter 2, a social firm is a third type of firm in between a public and a private firm (Antinori, 2000; Antinori & Bray, 2005). The institutional behaviour of a social firm resembles both public and private firms.

Before analysing the organisational capacity of CFUGs, a profile of participant CFUGs is given in Section 6.2 in order to provide a basis for the analysis. The organisational capacity of CFUGs is then analysed and results are presented in Section 6.3. This is done by looking at: internal resources; property rights for timber; relationships with external organisations; and government policies.

The context of the organisational capacity of CFUGs is for timber production that is directed at market sales. Timber production refers to arranging logging and market sales either in the form of logs or sawn wood after some elementary processing. For this, in addition to the CFUGs, other organisations such as government agencies (District Forest Office and District Cottage and Small Industry Office) and private firms (log buyers and saw millers) are also important in the timber market chain. Therefore, a different sampling method, and different data collection techniques were used, compared to Chapters 4 and 5. In the previous chapters, quantitative data was collected using random sampling of CFUGs, whereas for organisational capacity, qualitative data in the form of personal views of respondents, was collected using a non-random sampling method. Data was collected from key respondents of CFUGs, government agencies, and private firms. Most of the key respondents were interviewed in their office.

In addition to the personal interviews, some extra field visits were made to community forests, CFUGs, and important non-governmental organisations (NGOs). These field visits

were often coupled with informal interactions. Finally, the secondary data collected in Chapter 4 was also compared with the personal interview and the field visits, in order to check the validity of the data by using the triangulation method.

Altogether 39 key respondents were interviewed (21 from CFUGs, 10 from government agencies, and 8 from private firms). These interviews were conducted using a semi-structured, open-ended questionnaire as explained in Chapter 3. Just over two thirds of the key respondents were interviewed in full, taking between one and three hours. The remaining respondents were partially interviewed because of time constraints for respondents. This shorter survey took 20 – 59 minutes. The breakdown of the survey is shown in Table 6.1.

Table 6.1 List of organisations that participated in interviews.

Organisation	Number of persons interviewed			Extra field visit
	Full	Partial	Total	
CFUG	12	9	21	8
Government	9	1	10	0
Private firm	7	1	8	0
Non-Governmental	0	0	0	2
Total	*28*	*11*	*39*	*10*

Extra field visits were also made to 8 CFUGs and 2 NGOs. Respondents of these organisations were not interviewed, but interacted with informally. Fifteen out of 39 interviews were recorded into a voice recorder. These interviews were transcribed later in Nepali and then translated in English. The other 24 interviews were not recorded into a voice recorder because there was no consent for any recording. These interviews were noted down on the questionnaire as much as possible during the interview. After completion of each interview, some time was spent on reflecting on whether all points were noted down on paper. Any missing point was added at the reflection.

6.2 Profile of respondents

6.2.1 Respondents from CFUGs

Some details of respondents from CFUGs are given in Table 6.2. Full details are not disclosed in order to respect anonymity of respondents. The first column represents the study area district. The second column represents sample CFUGs. The initial three letters of the respondent's code represent the district, followed by the CFUG code number. The following columns are year of establishment, household number, forest area, growing stock, annual harvest, and market sale amount. The last column shows the position of the respondent who was interviewed. Table 6.2 shows that the CFUGs sampled represent a good range of

population in terms of different features such as year of establishment (YoE), household number (HH), forest area (FA), growing stock (GS), annual harvest (AH), and market sales (MS).

Table 6.2 Characteristics of sample CFUG and key respondents (N = 21).

District	CFUG	YoE	HH	FA	GS	AH	MS	Position of Interviewee
Udayapur	Uda-CFUG 1	B	A	A	C	A	A	Chairperson
	Uda-CFUG 2	C	A	A	B	A	0	Chairperson
	Uda-CFUG 3	C	A	A	D	0	0	Ex Chairperson
	Uda-CFUG 4	C	A	B	D	0	0	Vice-Chairperson
	Uda-CFUG 5	C	A	A	D	D	D	Chairperson
	Uda-CFUG 6	B	A	A	D	A	A	Chairperson
	Uda-CFUG 7	B	B	A	B	B	A	Chairperson
	Uda-CFUG 8	B	A	A	C	B	B	Chairperson
	Uda-CFUG 9	C	A	A	B	B	B	Ex-Chairperson
	Uda-CFUG 10	C	A	B	B	B	A	Chairperson
	Uda-CFUG 11	A	B	B	C	C	B	Chairperson
	Uda-CFUG 12	A	A	A	B	A	A	Chairperson
Rupandehi	Rup-CFUG 1	B	E	A	B	A	0	Office Secretary
	Rup-CFUG 2	B	D	A	C	E	0	Treasurer
	Rup-CFUG 3	C	E	B	C	D	B	Secretary
	Rup-CFUG 4	B	A	A	C	A	0	Chairperson
	Rup-CFUG 5	B	A	A	C	A	0	Chairperson
	Rup-CFUG 6	A	A	A	C	A	0	Chairperson
	Rup-CFUG 7	C	E	A	D	B	0	Chairperson
	Rup-CFUG 8	A	A	C	B	A	0	Chairperson
	Rup-CFUG 9	C	E	A	B	A	0	Office Secretary

Legend: YoE – year of establishment (A – < 5, B – 5-9, C – 10-14); HH – Household (A – <500, B – 500-999, C – 1000-1499, D – 1500-1999, and E – >1999); FA – Forest area in ha (A – less>500, B – 500-999, and C – 1000-1499); GS – growing stock in m3/ha (A – <50; B – 50-99; C – 100-149; and D – 150-199); AH – Annual harvest and MS – Market sale in m3 (0 – no harvest or no sale; A – <50, B – 50-99, C – 99-149, D – 150-199, E – >199)

The last column of Table 6.2 shows the positions of interviewees from the sample CFUGs. These positions reflect key people who are assumed to be knowledgeable and experienced. In 14 out of 21 interviews, respondents were the Chairperson of their CFUG committee. Five other interviewees were either the former Chairperson or a key Executive Committee member of the CFUG. In two cases the interviewees were Office Secretaries. The Office Secretary is an employee of a CFUG, whose primary duty is paperwork.

The details of the sample CFUGs are given in categories A, B, C, D, and E instead of actual numbers in order to respect anonymity of key respondents. Each key respondent can easily be tract if actual numbers of sample CFUGs are given. Overall, the sample CFUG of this study covers a good range of categories in different characteristics.

6.2.2 Respondents from government organisations

6.2.2.1 District Forest Office

The district forest office (DFO) is the main government agency for administering community forestry. There are 74 DFOs under the Department of Forest (DoF) in Nepal. The lower administrative units in the DFOs are the Area Forest Office (AFO) and the Range Post (RP). All 74 DFOs of Nepal are categorised into three levels – A, B and C, and are based on the forest cover, the importance of protection, management and administration in the district. Based on this classification, the number of AFOs and RPs, and thus staff, are allocated. For example, A, B and C class DFOs, consist of three, two, and one AFOs respectively. Each AFO consists of 5 to 8 RPs. The Udayapur DFO falls in the A class and has three AFOs and 18 RPs, whereas the Rupandehi DFO falls in the B class and has only two AFOs and 12 RPs.

The overall responsibility of the DFO is held by the District Forest Officer, referred to as the DF Officer hereafter. Also, the person in-charge of the AFO and the RP are the Assistant Forest Officer (referred to as the AF Officer hereafter) and the Ranger respectively. The DF Officer, the AF Officer and the Ranger are formally trained people from forestry colleges and are considered to be forestry technicians in the Nepalese bureaucracy. The other administrative staff such as accountants, clerks, armed forest guards (AFG), and forest guards (FG), are considered to be non-technicians. The AFGs are specifically trained as police and equipped with guns to control illegal timber smuggling, from forests in the Terai and Inner-Terai regions of Nepal. Unlike the AFG, the FG is unarmed and trained in basic forestry technical skills such as nursery and plantation management, tree felling and measuring logs.

The general process of service delivery from the DFO to a CFUG begins with a request from a CFUG in written form. The DF Officer then instructs the relevant AFO. Finally, the AFO instructs the territorial RP to assist the CFUG. Thus, Rangers are involved with CFUGs to assist them in forestry related matters on behalf of the DFO. Occasionally, a FG is sent to a CFUG as a substitute for a Ranger when the Ranger is busy and the assistance required is not that technically demanding.

6.2.2.2 District Cottage and Small Industry Office

The District Cottage and Small Industry Office (DCSIO) is another important government agency for CFUGs in the district, especially for the registration of a forestry-based industry. The DCSIO issues licenses for cottage and small industries in the district. A cottage industry is defined as a very small scale industry which utilises specific skills or local raw materials and resources, and has up to Rs200,000 equivalent physical assets ("Industrial Enterprises Act of Nepal," 1992). An industry which has higher value physical assets than a cottage industry,

but less than Rs30 million equivalent physical assets, is defined as a small industry. A sawmill or furniture factory can fall in either the cottage or the small industry category.

The profile of key respondents interviewed from the DFO and DCSIO is given in Table 6.3. The sample represents the key government staff administering CFUGs for timber production and market sales. Key staff of the DFO such as the DF Officer, AF Officer, and Rangers, and key staff of the DCSIO were interviewed. Junior staff and administrative staff were not interviewed. The actual position of respondents is not disclosed in order to provide anonymity. For example, there is only one DF Officer in each district and his anonymity is lost if the position is disclosed.

Table 6.3 Key respondents from Government organisation* (N = 10).

Government organisation	Key Respondent	Job experience (year)
DFO and DCSIO, Udayapur	Uda-GO 1	20
	Uda-GO 2	25
	Uda-GO 3	10
	Uda-GO 4	15
	Uda-GO 5	12
	Uda-GO 6	15
DFO, Rupandehi	Rup-GO 1	17
	Rup-GO 2	14
	Rup-GO 3	20
	Rup-GO 4	6

Note: *Other details are not disclosed to keep anonymity of key respondents

Key respondents' are coded in a similar fashion to CFUG respondents. The government organisation is given in the first column of Table 6.3. In the second column the initial three letters indicate the district, followed by the abbreviation for the government organisation (GO) and the number to denote the respondent. In the third column, job experience is given. Most of the key respondents have more than 10 years of job experience. These respondents had experience not only in the current district, but also in other districts of Nepal. For some respondents, this was their second or third term in the district. Therefore, these key respondents were experienced and knowledgeable people in the area of assisting community forests for timber production and market sales.

6.2.3 Respondents from Private Firms

Log buyers (LB) and sawmills are the important private firms (PFs) for CFUGs in producing logs and market sales. For internal sales of timber, PFs do not have an important role to play as the CFUG can harvest timber and manage sales on their own. The LB often plays the role

of a middleman between a CFUG and a sawmill. Sawmills usually process logs and carry out retail sales of sawn wood as well.

For sampling purposes, information about LBs is difficult to find *a priori* compared to sawmills. The LBs were found to be composed of anything from a one man business, to a small group of individuals with no details such as the name of the organisation and contact address. This way continues largely because there is no proper mechanism for registration with the government. In the case of sawmills however, these are registered with the DCSIO or the Department of Industry, depending on their size, and it is easier to find information to contact them.

The profile of key respondents from private firms is given in Table 6.4. The first column of the table shows the district. The second column shows the code of the respondent. The third and fourth columns refer to years of operation and the business types of the respondents. Three out of eight PFs are involved in only log buying (LB). The rests are involved in log buying, sawmilling and retailing. The remaining columns are annual turnover, number of staff and sources of timber. The owners of all these firms were interviewed, except Rup-PF3, where the Manager was interviewed because the owner was not available during the survey. Therefore, respondents of these private firms are key people.

Table 6.4 Respondents from private firm and firm's profile (N = 8).

District	Respondent	YO	Business type	Annual turnover	Staff Number	Source of timber (%)			
						CF	GF	TCN	PF
Udaya pur	Uda-PF 1	7	LB, SM, R	300 m3	8	60	15	0	25
	Uda-PF 2	5	LB	420 m3*	3	75	25	0	0
	Uda-PF 3	4	LB	1200 m3	10	90	8	0	2
	Uda-PF 4	14	LB, SM, R	600 m3	13	80	20	0	0
	Uda-PF 5	5	LB	Minimal	1	100	0	0	0
Rupan dehi	Rup-PF 1	31	LB, SM, R	500 m3*	10	50	25	20	5
	Rup-PF 2	22	LB, SM, R	600 m3	18	15	60	0	25
	Rup-PF 3	29	LB, SM, R	300 m3*	8	0	70	30	0

Note: YO – Year of operation; LB – log buying; SM – sawmilling; R – retailing; CF – community forest; GF – government forest; TCN – Timber Corporation of Nepal; PF – private forest; * equivalent amount with average price of timber Rs 12,000 per m3

Table 6.4 shows that the private firms that were surveyed represent a good range of private firms, in terms of years of operation, business type, annual turnover, staff numbers and sourcing of timber. For example, the year of operation of these private firms ranges from 4 to 31 years. Three out of 8 firms have been operating for more than 20 years, even before community forestry started in the Terai region and Inner-Terai region. Likewise, there is also a good mix of business types such as log buying, sawmilling and retailing. Similarly, the size

of these firms (annual turnover and number of staff) is relatively big, except Uda-PF 5, compared to the average annual harvest of a CFUG (49.9 m3 in Udayapur) in the study area. The Uda-PF1, Rup-PF1, Rup-PF2, and Rup-PF3 may have reported a lower turnover amount to show a lower profile, while the survey was conducted. The amount of timber piled in their yards looked huge when the researcher visited these firms.

The usual processes of log buying, sawmilling and retailing are as follows. LBs and sawmills buy logs from CFUGs as well as from other sources, such as public and private forests. The sale of logs from a public forest has to be done by a sealed bidding auction system. Sales from community forests also follow a similar procedure. The highest bidder can get the timber if the bidding offer meets the minimum price directed by the government, which is Rs250 per cubic foot of log in the case of Sal. After a successful bid, the logs are marked as "Sold Mark" from the CFUG as a sign of being sold legally. This must happen before the winning bidder can load them onto a truck. According to the Forest Act 1993, a CFUG must put a sold mark on the logs before issuing a transport permit. However in practice, in addition to the CFUG mark, the DFO also puts on a "Sold Mark" and issues a transport permit to the winning bidder. Thus, in practice the log buyer has to obtain permits both from the CFUG and the DFO. The permit includes details of the logs such as species, size, the quantity of timber and the destination sawmill.

The LB or sawmill transports the logs from the CFUG to the sawmill. For sawing, the sawmill is asked to obtain a permit from the territorial DFO. The sawing permit is not needed in the Kathmandu valley only. The DFO may check a sawmill at anytime to ensure the timber is from a legal source. The DFO can prosecute a sawmill if it is found with timber from an illegal source. Sawmills not only saw timber but also usually retail. Sawmills must provide a bill of purchase, with details of sawn wood, the selling date, species of timber, dimensions and the amount. The customer must keep the bill while transporting the timber to show that the source of timber was legitimate and legal. Otherwise, the customer may face an official enquiry and could be taken into custody by police or forestry staff.

Community forests are the main source of timber for at least six out of eight firms and are especially important in the Udayapur district (Table 6.4). The next major source of timber is the government forests (public forests) which are important especially in the Rupandehi district. The other sources were the Timber Corporation of Nepal (TCN) and private forests. Private forests have only a minor role in supplying timber for these firms. The TCN is a quasi-government timber business firm that sources timber from government forests.

6.2.4 Summary

In summary, the sample CFUGs represent a good range of cases – from relatively new to those with a longer history, from those that harvested timber to those that did not, and those that sold timber to the market and those that sold timber internally only. Also, the key government organisations and private firms that are involved in timber production and sales are included in the sample. Respondents were all key people who have experience, knowledge and responsibility. Therefore, the interviews from these respondents are relevant in reflecting the true picture of the organisational capacity and institutional barriers to timber production and market sales from community forests. Based on the interviews of these respondents, the organisational capacity of CFUGs for timber production and market sales is analysed.

6.3 Organisational capacity

The organisational capacity of CFUGs for timber production and market sales, depends on some key factors. As guided by the literature in Chapter 2, these factors are internal resources, property rights for timber, relationships with external organisations, and government policies. These factors were studied by asking respondents a range of questions during the interview. As explained in Chapter 3 the responses were analysed using NVivo 8, a qualitative data analysis computer software programme. With NVivo, the texts of the interviews of respondents are used to analyse key words, and themes are drawn from the coding process. A theme can be defined as the main idea running through an issue or problem. Themes are drawn from a logical relationship of nodes through the means of commonly shared codes. The themes related to the organisational capability of CFUGs for timber production and market sales are shown in Figure 6.1.

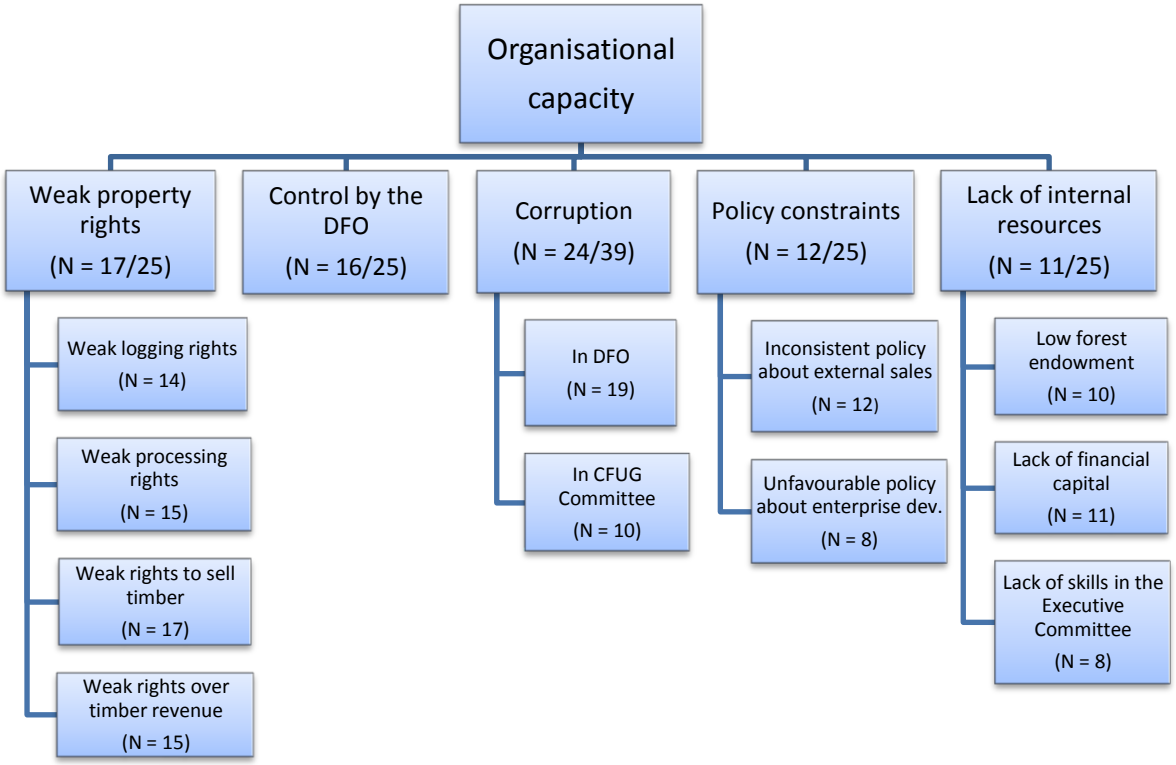


Figure 6.1 Organisational capacity themes.

Figure 6.1 shows that the most important theme for organisational capacity was found to be the weak property rights for timber. Seventeen out of 25 respondents expressed the view that the property rights for timber are weak. This weak property rights theme is followed by: control by the DFO; corruption; policy constraints; and the lack of internal resources. The importance of these themes is determined by the frequency stated by respondents. Each theme can have sub-themes or sub-categories. Each theme and its sub-categories are presented and discussed below.

6.3.1 Weak property rights for timber

Weak property rights for timber appeared to be the most important theme for the organisational capacity of CFUGs for timber production and market sales. As mentioned in the literature review, property rights in the case of community forests, are a bundle of rights for forest management, logging, processing and sale (Antinori, 2000; Bray et al., 2006). Forest management may consist of many activities from plantation to protection, thinning to harvesting, and processing to selling, and therefore, could be a vague topic. So, questions related to forest management were not asked of respondents.

A number of general to specific questions related to property rights were asked of CFUG respondents, government staff and private firm respondents. The specific questions were related to logging rights, processing rights, selling rights, and timber revenue use rights.

Before going to the specific questions, the respondents' perceptions about the ownership of forests and timber were sought. The perceptions' of respondents regarding ownership of community forests and timber is important in order to understand issues related to property rights. To understand perceptions, the following questions were posed:

Who owns the community forest?

Who owns the logs and sawn timber harvested from the community forest?

The perceptions of respondents regarding ownership of community forests and timber are summarised in Table 6.5 (a) and Table 6.5 (b). In Table 6.5 (a), two main observations can be made. First, many respondents, especially from CFUGs, believed that ownership differs in legal status and in practice. From the legal status to practice, the community ownership perception dropped from 11 to 6 respondents, whereas the government ownership increased from 4 to 11. Second, the most common perceptions of the legal ownership of community forests were community and joint.

The trend of ownership change is even more evident in Table 6.5 (b). Almost all respondents expressed the view that the ownership of timber was with the community legally. However, in practice, ownership by the community slipped down to 11 from 23. On the other hand, ownership by the government increased from zero to eleven. The perception of ownership in practice shifting from the community to the government was mainly expressed by CFUG respondents. Unlike the CFUG respondents, government staff believed that ownership had not changed, legally as well as in practice.

Table 6.5 Respondent's perception about ownership of forest and timber (N = 25*).

Respondent	District	6.5(a) Ownership of forest (N)						6.5(b) Ownership of timber (N)					
		Legal status			Practice			Legal status			Practice		
		G	C	J	G	C	J	G	C	J	G	C	J
CFUG	Rup	1	1	5	5	0	2	0	7	0	6	0	1
	Uda	1	6	2	6	2	1	0	8	1	5	3	1
	Sub-total	*2*	*7*	*7*	*11*	*2*	*3*	*0*	*15*	*1*	*11*	*3*	*2*
GO	Rup	1	1	2	0	0	4	0	4	0	0	4	0
	Uda	1	3	1	0	4	1	0	4	1	0	4	1
	Sub-total	*2*	*4*	*3*	*0*	*4*	*5*	*0*	*8*	*1*	*0*	*8*	*1*
	Total	*4*	*11*	*10*	*11*	*6*	*8*	*0*	*23*	*2*	*11*	*11*	*3*

Note: N – number of respondents; * six respondents were not asked because of time constraints; G – government; C – community; and J – Joint

Thus, legally the perceptions of respondents about ownership of the community forests and timber were that ownership was with the CFUGs. However, in practice, these ownerships were believed to be with the government. As to why the respondents' perceptions about the ownerships being different, in legal status and in practice, are analysed in terms of property rights for logging, processing, selling and revenue use.

6.3.1.1 Weak logging rights

The logging rights of CFUGs appeared to be weak. Fourteen out of 25 respondents stated that the logging rights were weak. To determine the logging rights of CFUGs in the community forests, the following question was asked of CFUG respondents and government staff.

Can the CFUG harvest timber? If not, why?

Views of respondents are summarised in Table 6.6. Fourteen out of 25 respondents said the CFUGs had no logging rights. This view was expressed mainly by the CFUG respondents. This was followed by the view 'yes with permit'. The view that there were conditional logging rights for CFUGs mainly came from the government staff. In contrast to these, only 2 respondents said that the CFUGs had logging rights.

Table 6.6 Views of respondents about logging rights (N = 25).

Respondent	District	Logging rights to CFUG (N)			
		Yes	No	Yes with permit	Total
CFUG	Rupandehi	0	8	0	8
	Udayapur	0	6	3	9
GO	Rupandehi	0	0	4	4
	Udayapur	2	0	2	4
	Total	*2*	*14*	*9*	*25*

The main reason for 'no' and 'conditional' logging rights appeared to be the control exercised by the DFO (Table 6.6). CFUGs were asked to obtain permits from the DFO even to harvest timber specified in the work plan. The conditions for logging seemed to be different in the two districts. In the Udayapur district, CFUGs were allowed to harvest green trees after obtaining permission from the DFO. Unlike this however, in the Rupandehi district, CFUGs were not allowed to harvest green trees. All 8 CFUG respondents said that they were allowed to harvest only dead and dying tress after obtaining permission from the DFO. Apparently, there was no meaning of the work plan in this district.

The following statements illustrate weak or no logging rights for CFUGs in both districts:

We have not cut green trees so far because we could not get permission from DFO (Rup-CFUG 7)

Even for cutting dead and fallen trees we have to visit the DFO 8 – 10 times to obtain permission. In fact, two visits should be sufficient (Rup-CFUG 8)

---we allow CFUGs to harvest only dead and fallen trees (Rup-GO 3)

---CFUGs have logging right including the ownership of logs but controlled by the DFO in practical sense (Uda-CFUG 1)

In contrast to the CFUG respondents, three government staff argued that they did not control the logging rights of CFUGs and neither did they issue permits. Rather they said that they provided 'approval' or 'technical assistance' to CFUGs for logging and market sales based on the work plan and the CFUGs' request. Even if the government staff used different terms, the logging rights of CFUGs appeared to be weak.

Despite having no logging rights in the Rupandehi district, there seemed to be little impact on timber production and market sales, because majority of the community forests were degraded. The absence of logging rights might have impacted on only a few relatively well stocked community forests in this district. Comparatively, the weak logging rights may have a greater impact on timber production and market sales in the Udayapur district because the conditions of community forests in this district were better. Eventually, the weak logging rights are believed to have some impact on the organisational capacity of CFUGs.

Thus, the logging rights of CFUGs were found to be weak in both districts. In the Rupandehi district, the logging rights appeared to be worse. The weak logging rights are believed to have some impact on timber production and market sales and eventually, to the organisational capacity of CFUGs.

6.3.1.2 Weak timber processing rights

After the logging rights, respondents were asked questions related to the timber processing rights of CFUGs. The timber processing rights are important for two reasons. First, processing can help to reduce waste. Second, the processing rights can help CFUGs to add value by setting up a timber-based enterprise such as a sawmill or furniture factory.

The following question was posed to CFUG respondents and government staff:

> Can the CFUG or group of CFUGs process timber obtained from community forest? If not, why?

The timber processing rights appeared to be weak in CFUGs. Respondents' views are summarised in Table 6.7. This Table clearly shows that there was no or very weak timber

processing rights for CFUGs. Fifteen respondents, mainly from CFUGs, expressed the view that they did not have processing rights, especially when aiming for market sales or timber enterprises. For internal use however, the processing rights appeared to be not an issue. In contrast to this, 8 respondents, mainly from government staff, said 'yes' indicating that the CFUGs have timber processing rights. The views of the majority of CFUG respondents and government staff appeared to be divided.

Table 6.7 Views of respondents about timber processing rights (N=25).

Respondent	District	Timber processing rights to CFUG (N)			
		Yes	No	Not sure	Total
CFUG	Rupandehi	1	5	0	6
	Udayapur	1	8	0	9
GO	Rupandehi	2	0	2	4
	Udayapur	4	2	0	6
	Total	*8*	*15*	*2*	*25*

Additional to the 15 respondents who said 'no' to timber processing rights, all CFUGs have been observed selling logs instead of sawn timber or other finished products. Four out of 9 CFUG respondents of the Udayapur district reported that they had tried to set up a furniture factory or a cooperative sawmill in order to add value to their timber, but failed because of discouragement from the DFO. From this it is obvious that weak processing rights can impact on the organisational capacity of CFUGs for timber production and market sales. Also, the following statements clearly illustrate that timber processing rights of CFUGs seem to be weak:

> *Legally we can process timber, however, we would be put into difficulty by the DFO if we process timber without obtaining permission (Rup-CFUG 9)*
>
> *No, we can not process timber obtained from community forest (Uda-CFUG 1)*
>
> *No, we do not have the processing right. We tried to initiate a small furniture factory by formulating a sub-group of our members, but we were not allowed. Now this sub-group is functionless (Uda-CFUG 4)*

Unlike the CFUG respondents, government staff argued differently about the processing rights. According to them, for sawmilling and/or furniture making, factors such as a lack of economies of scale, lack of adequate capital and human resources, and complicated bureaucratic processes of registration, were the key issues. Certainly, these were important issues to set up timber enterprise. The following statements illustrate that the lack of economies of scale and inadequate financial capital are constraining further processing and enterprise development:

No there is no policy constraints for running a timber enterprise. It can be done by putting in the work plan if DFO is convinced. There might be the issue of economies of scale (Rup-GO 4)

CFUGs can run a sawmill and sell timber to the market if more than one CFUGs collaborate to each other. Single CFUG can not because of inadequate financial capital and raw materials (Uda-GO 5)

We do not have much timber to start an enterprise (Rup-CFUG 9)

The economies of scale appeared to be one of the crucial factors for enterprise development. Forest Regulations 1995, rule 32, sub-rule (4) states "In case the Users' Group capable of running an industry based on Forest Products according to the work plan, it may run such industry outside the area of the community forest after obtaining the approval of concerned agency on the recommendation of the DF Officer". Based on this rule a DF Officer can disagree to recommend on the ground of economies of scale. The issues of scale and financial and human capital for enterprise development are further discussed in Chapter 7.

All the evidences mentioned above shows that the processing rights of CFUGs are weak. As a result, CFUGs were found to be selling the logs instead of sawn timber or furniture. The weak timber processing rights is believed to have an impact on the organisational capacity of CFUGs. Certainly, the scale issue is a problem for setting up an enterprise. CFUGs' rights to selling timber are analysed in the next sub-section.

6.3.1.3 Weak rights to sell timber

After the timber processing rights, question related to selling rights was asked of the CFUG respondents and government staff. The focus of selling rights was on the market sales rather than internal sales. The following question was asked of the CFUG respondents and government staff:

> Can the/a CFUG sell timber obtained from community forests to anybody/party the/a CFUG want? Please explain.

The rights of CFUGs to sell timber were found to be weak. Views of respondents are summarised in Table 6.8.

Table 6.8 Responses of respondents about selling rights to CFUG (N = 25).

Respondent	District	Selling rights to CFUG (N)			
		Yes	No	Yes with permit	Total
CFUG	Rupandehi	0	7	0	7
	Udayapur	0	7	2	9
GO	Rupandehi	0	2	2	4
	Udayapur	2	1	2	5
	Total	*2*	*17*	*6*	*25*

Table 6.8 clearly shows that the CFUGs have no or weak rights to sell timber. Seventeen out of 25 respondents said that CFUGs have 'no' rights to sell timber. This is followed by the 'yes with permit' category, which can be interpreted as conditional rights to sell timber. For the weak rights to sell timber, there appeared to be two main reasons. CFUGs were not allowed to sell timber to the market. They were asked to obtain a permit from the DFO. Furthermore, the DFO was found to be putting a number of conditions to CFUGs, to discourage market sales. The following three main conditions from the DFOs were found to be common to both districts:

- Timber has to be surplus to community needs. A CFUG must sell timber to its members first.
- The sale has to be through a sealed bidding auction system. This means a CFUG can not sell timber to any specific firm.
- The buyer has to be a registered firm in the government system. An individual or a party that has not registered in the government system can not participate in the auction.

In addition to Table 6.8 and the conditions set by the DFO, the following statements illustrate weak CFUG rights to sell timber to the market:

> *No, we can't. We can sell timber to local people and organisations such as local school or clubs without permission of the DFO. For market sale, we must sell through auction by obtaining permission from the DFO (Uda-CFUG 9)*
>
> *On the basis of Forest Act 1993 we have authority to sell our forest product as we wish issuing transport permit. But in practice this is not true. We sign and issue timber transport permit but government controls everything (Uda-CFUG 3)*
>
> *After meeting the internal demand they can sell surplus timber to the market after making a decision (Uda-GO 2)*

It was clear that in weak selling rights a CFUG's organisational capacity could not be developed. However, government staff argued that these market sale conditions were set, based on the forestry policy of Nepal – Forest Regulations 1995 and Forest Product Auction Sale: Administrative Procedure 2003 (Ministry of Forest and Soil Conservation of Nepal, 2003). According to Rule 33, sub-rule 1 of the Regulations, forest products obtained in accordance with the work plan are to be consumed by the CFUG itself, or the CFUG may distribute the products. And sub-rule 2 states that the CFUG can sell forest products to the market. The second document is actually prepared for the sale of forest products sourced from government forests. However, DFO staff appeared to be applying the same administrative

procedure to community forests as well. Furthermore, they opined that the sealed bidding auction system would ensure free competition among buyers that can then increase the price of timber in favour of CFUG. The following statements illustrate why government staff set conditions of market sales for CFUGs:

> *CFUGs have high internal demand for timber. They have the priority to meet the internal demand for timber (Uda-GO 2)*
>
> *CFUGs have to sell timber through auction. This provision is kept because to make maximum benefit to CFUG from free competition (Rup-GO 2)*

Thus, the selling rights of timber for CFUGs are found to be weak. The weak rights are believed to impact on the timber production and market sales, and on the organisational capacity of CFUGs eventually. The revenue use rights obtained from timber is analysed in the next sub-section.

6.3.1.4 Weak rights over timber revenue

Finally, the use rights of revenue obtained from timber was analysed, in order to examine the status of property rights for timber in CFUGs. As mentioned in the literature review, timber was the main source of revenue for CFUGs. The following two questions were asked of CFUG respondents and government staff:

> Is the CFUG constrained in spending revenue from timber sales in the way it desires?
>
> What are the activities that the CFUG has spent money on?

Respondents' views about revenue use rights of CFUGs are summarised in Table 6.9. This Table shows that the CFUGs' rights over timber revenue are weak, particularly from the perspective of CFUG respondents. For CFUG respondents, the revenue use rights were constrained. Unlike this, government staff believed that the revenue use rights were not constrained. The main activities that CFUGs were found to be using their revenue for, were community development activities, forest development activities and poverty reduction.

Table 6.9 Respondents' views about revenue use rights (N = 25).

Resp	District	Revenue use rights (N)		Main use of CFUG revenue
		Constrained	Not constrained	
CFUG	Rup	6	0	FDA, CDA, poverty reduction
	Uda	9	0	CDA, FDA, Admin., poverty reduction
GO	Rup	0	4	FDA, CDA, poverty reduction
	Uda	0	6	CDA, FDA, poverty reduction
	Total	*15*	*10*	

Note: FDA – forest development activities like protection and plantation; CDA – community development activities like school and electrification; Admin – Administration

Despite the argument of government staff, revenue use rights of CFUGs appeared to be constrained. Most of the 15 CFUG respondents said that they needed permission from the DFO to spend the revenue. Further, four out of 9 CFUG respondents of the Udayapur district reported that the DFO could even suspend the bank account of a CFUG as a monitoring duty, guided by forestry policy such as the Master Plan of Forestry Sector 1989 and the Forest Act 1993. The following statements illustrate the weak rights over timber revenue:

> *Yes, we are constrained to spend our fund. There is a guideline set by the DFO and we must follow this guideline (Uda-CFUG 1)*
>
> *---DFO has set up a guideline of spending fund, which are FDA 25%, CDA 25%, poverty reduction 25%, Administrative expenses 10% saving 10% and charity/donation 5%--- (Uda-CFUG 6)*
>
> *---In the mean time, DFO also suspended our bank account for sometimes. All these contributed disputes in CFUG so we could not harvest (Uda-CFUG 4)*
>
> *There is no constraint to spend CFUG money. However, DFO has prepared a guideline for spending money. CFUG can spend their fund within the boundary of the guideline and annual programme. This guideline is based on the Forest Act 1993 and the Master Plan of Forestry Sector 1989. This has been started two years ago--- (Uda-GO 1)*

In contrast, a few government staff argued that the DFO did not constrain CFUGs, except for the minimum 25% of annual income to go on forest development activities which is mandatory by law (Forest Act 1993).

Thus, CFUGs rights over the use of timber revenue appeared to be weak. CFUGs were found to be constrained by the DFO to use revenue obtained from timber. The mandatory expenditure of 25% of annual income into forest development activities seemed to be a basis to limit the CFUGs rights over the use of timber revenue.

In addition to the CFUGs, property rights for timber in private firms was also analysed to check the overall status of property rights in the timber business. For this, the following questions related to property rights for timber were asked of eight private firm respondents.

> Can the firm buy, own, transport, process, store, and sell timber as the firm like, explain?
>
> Have the firm encountered any property rights related problems to process, transport, and after-process timber sale? What are these problems?

The property rights for timber in the case of private firms were also found to be weak. All eight private firm respondents believed that property rights for timber are controlled by the DFO. For example, the private firms are asked to obtain sawing permits and transport permits

if they want to supply products to the market. The following statements illustrate that the property rights for timber in the subsequent market chain are weak:

> *In simple way, we can do our timber business because we are used to. But, if you ask me as I should be, like a small industrialist, no I can't. We are forced to obtain the transportation and sawing permits from the DFO (Uda-PF 1)*

> *All our property rights for timber are controlled by the DFO. Some degree of control is necessary for check and balance. However, the DFO's control is more than necessary--- (Rup-PF 2)*

6.3.1.5 Summary

Property rights for timber were examined in this section to analyse the effect on the organisational capacity of CFUGs for timber production and market sales. Property rights for timber in terms of logging rights, processing rights, selling rights, and revenue use rights, were found to be weak. Apparently, there were no logging rights for CFUGs in the Rupandehi district. Compared to this, logging rights were slightly better in the Udayapur district. CFUGs are required to obtain logging permits from the DFO, including even the amount specified in the work plan. Likewise, the processing rights for timber were found to be weak. As a result, CFUGs were found to be selling logs only – not in other forms such as sawn wood or furniture. Thirdly, the selling rights for timber also appeared to be weak. CFUGs were not constrained in the selling of timber internally. However for external sale, they were allowed to sell only timber that was surplus to the internal demand. As a result, the market sale was apparently nil in the Rupandehi district. Finally, the revenue use rights were also found to be weak and controlled by the DFO. CFUGs were asked to obtain permits from the DFO to spend their revenue and were required to be guided by the DFO.

Because of these restraints, most of the respondents believed that the ownership of community forests and timber obtained from community forests, belonged to the government in practice, even though they thought the ownership was with them legally. Also, property rights for timber were found to be weak, not only in the CFUGs but also in private firms, indicating weak property rights in the whole market chain.

Thus, weak property rights for timber are believed to have an impact on the organisational capacity of CFUGs for timber production and market sales. Additionally, control by the DFO as an external organisation may have an effect on the organisational capacity of CFUGs. The control by the DFO is analysed in the next section.

6.3.2 Control by the District Forest Office

Based on the literature, Chapter 2, relationships of CFUGs with government agencies, non-governmental organisations and private firms are important for timber production and market sales. A number of questions related to the relationships of CFUGs with these external organisations were asked of CFUG respondents, government staff, and private firm respondents, in order to examine the effect on the organisational capacity of CFUGs for timber production and market sales. Among these, the relationship with the DFO, and more specifically control from the DFO for timber production and markets sales, was found to be a crucial factor of the organisational capacity of a CFUG. Therefore, this section is mainly devoted to this aspect. At the end of this section, the roles of the PFs and the NGOs are briefly discussed.

To begin analysis of the importance of CFUG relationships with external organisations, the following question was asked of CFUG respondents and government staff:

For timber production, what were the important external organisations to the CFUG?

Respondents' views about important external organisations to CFUGs for timber production and sales are summarised on Table 6.10. This Table clearly shows that the DFO is the most important external organisation, for a CFUG to produce timber and market sales. The DFO is followed by the Federation of CFUGs (FECOFUN), private firms, NGOs, INGOs, and others, based on the district and respondents. However, FECOFUN is not an external organisation but rather a federation of CFUGs. FECOFUN advocates for the general rights of CFUGs. Therefore, FECOFUN is omitted from further analysis. Also, INGO was found to be important only in the Rupandehi district for the general support of the community forestry programme, but not specifically for timber production and market sales.

Table 6.10 Important external organisations to a CFUG: Respondents' views.

Respdt	District	Number of respondent	Most important organisation (N)					
			DFO	FECOFUN	PF	NGO	INGO	Other
CFUG	Rup	9	9	3	0	2	5	3
	Uda	9	9	4	6	2	0	1
GO	Rup	4	4	0	0	0	1	0
	Uda	3	3	2	2	2	0	0
	Total	*25*	*25*	*9*	*8*	*6*	*6*	*4*

Note: FECOFUN – Federation of community forest user group of Nepal; INGO – international non-governmental organisation; Other – District Soil Conservation Office, local Police Office, and Maoist party

So, the most important organisation for timber production and market sales is the DFO. The following statement sums up the views of most of the respondents:

DFO is the most important organisation to CFUGs for timber production and market sales. Other organisations have no specific importance (Rup-GO 3)

A list of questions related to CFUG relationships with the DFO was designed to examine the DFOs and its effect on timber production and market sales from community forests. For CFUG respondents, the following questions were posed:

Has the CFUG encountered any problems from external organisations in terms of logging and market sales?

How does the CFUG determine whether or not to sell timber to the market?

Questions were slightly modified to government staff considering that the same questions might not be relevant to them. For government staff, the following more general and indirect questions were asked:

How does a CFUG generally determine the species and amount of timber to harvest (?), for example, based on working plan, DFO permission, and market demand?

What is the basis of a CFUG for whether or not to sell timber to the market?

In order to grow, harvest, transport, and sell timber by a CFUG, what kinds of permissions/approvals are necessary to obtain from the DFO?

All 25 respondents revealed that there were several steps and long administrative procedures in practice for harvesting logs and arranging market sales. These steps and administrative procedures are illustrated with the help of Figure 6.2.

The administrative procedure for logging and market sales from community forests begins with the decision of a general assembly meeting about the amount of timber and species (Figure 6.2). The decision has to be based on the working plan. Then, the Executive Committee applies to the DFO for tree selection and marking for felling, Step 1. After receiving the application the District Forest Officer, called the Officer hereafter, instructs the relevant Area Forest Office (AFO) and Range Post (RP) to assist the CFUG. The Officer then issues a tree felling and logging permit to the CFUG based on the field report of the Ranger or RP.

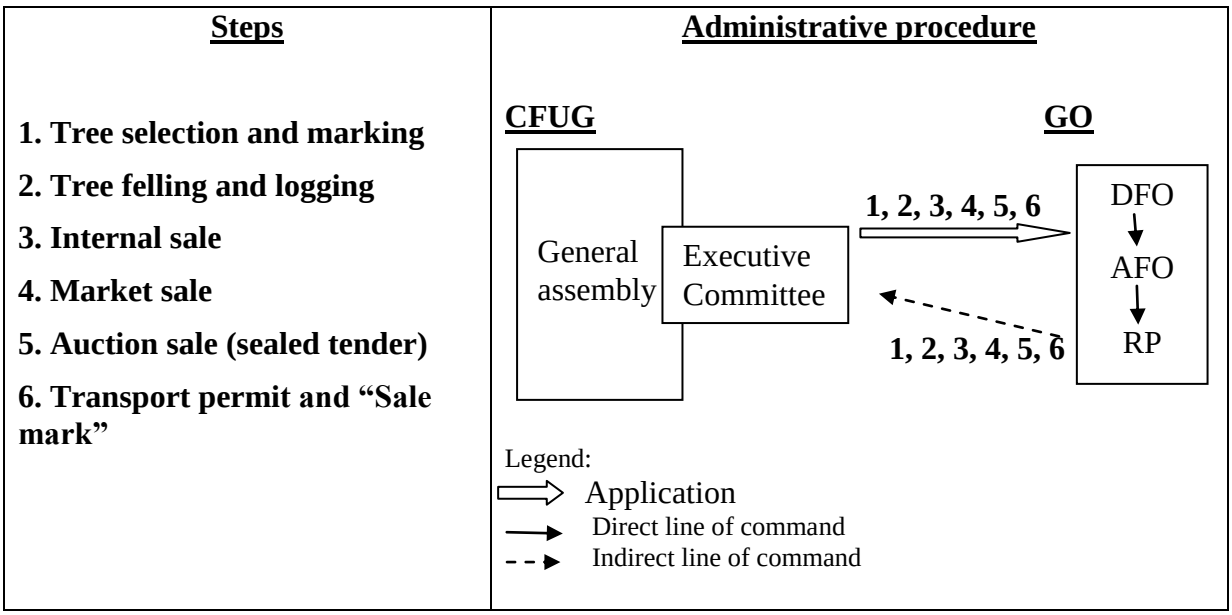


Figure 6.2 Steps and administrative procedure for logging and market sales.

At Step 2, the Committee then fells the trees and makes logs, Figure 6.2. Logs are generally collected at a depot for internal sale as well as market sale. A depot might not be needed if the timber amount is only for internal sale – that is, selling logs to their own members generally at the subsidised rate. The Committee has to arrange the internal sale before planning for market sales (Step 3). The Committee has to apply to the DFO for market sales if there is surplus timber from the internal sales. After getting permission, the Committee can then sell the timber to the market by the sealed tender bidding auction system (Step 4). The auction sale has to be publicised widely, for example, in at least two national daily newspapers and at least two weeks before the bidding date. Private firms that are registered with the income tax office can bid in the auction (Step 5). Finally, once the auction is complete, the top bidder is required to obtain a transport permit with a "Sale Mark" on the timber from the Committee, as well as from the DFO to transport logs to a sawmill (Step 6). Forest Regulations 1995, rule 35, sub-rule 2 states that the timber shall be transported pursuant to sub-rule (1), which is the issuing of a transport permit by the CFUG Committee and the use of the "Sale mark". This may be done only after informing the relevant Forest Office in advance and having the matter endorsed by check-posts located enroute. Despite this clear rule, the DFO has forced log buyers to obtain a transport permit as well as the "Sale Mark" from the DFO.

Further, the DFO's role seemed to be even more important for assisting CFUGs with the preparation and/or revision of the work plan. The technical assisting role of the DFO to a CFUG is stated in section 69 of the Forest Act 1993. On the basis of this, the DFO can put in

strong conditions for timber harvest. The following statements illustrate the crucial role of the DFO in preparing a work plan:

> *We do everything based on our working plan. But the very secret of the plan – it is prepared as the DFO staff's wish and convenience. If we propose something against their wish this will not be accepted (Uda-CFUG 9)*
>
> *Our annual allowable cut is 3257 cubic foot (about 93 m3), but we harvested only 1200 cubic foot (about 34 m3)--- because we could harvest only dead and fallen trees as stated in the working plan (Rup-CFUG4)*
>
> *The determining factor for log production is not the permission but the working plan of a CFUG. The plan guides how much to harvest and sale. The plan is the main 'mantra' for these activities (Rup-GO 4)*
>
> *---Although the main basis for timber production and market sales is the working plan, a CFUG needs the DFO's permission because to avoid fraud like cutting green and healthy trees but reporting as dead and dying trees (Uda-GO 1)*

In addition to the technical assistance role, the DFO has policing and judicial roles in the case of the national forests. For example, DFO staff argue that DFO staff, such as the Ranger and higher ranked Technical staff, can prosecute any person of a suspected forest offence, based on the Forest Act 1993. Furthermore, as per Section 65 of the Forest Act 1993, the DF Officer could hear a forestry case as a "Single Member Judge" of a Special Court and fine up to Rs10,000 and/or one year of imprisonment, if the estimated forestry offence is less than Rs10,000 worth. Forestry cases of higher value than this have to be filed at the District Court. These provisions are stated in the case of national forests. However, the DFO was found to be applying these provisions in the case of community forestry as well. A CFUG Respondent, whose case was filed at the District Court by the DFO, on the charge of over harvest compared to that stated in the working plan, was interviewed. The following statements illustrate the Policing and Judicial roles of the DFO which were crucial for timber production and market sales:

> *Forest Act 1993 has given the discretion power to the DF Officer in many situations which is affecting the timber production and the overall development of a CFUG (Rup-CFUG 8)*
>
> *When we sell out timber we have to sell to the market. If we sell timber without DFO's permission, staff will caught us and send to the jail (Uda-CFUG 9)*
>
> *Additionally, CFUGs are likely to be influenced by private firm while logging and selling. DFO's permission is necessary to avoid such influence (Uda-GO 1)*

Sixteen out of 25 respondents indicated that the control by the DFO was contributing to the low production and market sales. This response came mainly from those 13 community forests that have relatively better forest. The other 8 community forests had degraded forests.

As indicated above, the private firm's role was found to be important for logging and arranging market sales in the Udayapur district. Private firms were found to supply the initial investment in 7 out of 9 CFUGs that produced and sold timber in the year 2007/8. In addition to the CFUG respondents, three government staff in the Udayapur district indicated that private firms were providing financial capital, not only in arranging logging and market sales but also in the preparation of the working plan, which is the basis of logging and other activities. So, roles of private firms were found to be supportive to community forests of the Udayapur district for the production of timber and market sales. Their roles will be analysed further in Chapter 7 as institutional barriers for contracting.

Similarly, local NGOs have been found to be helping CFUGs to produce timber and market sales in the Udayapur district. When asked about NGO help, 8 out of 15 respondents from the Udayapur district expressed the view that the local NGOs helped CFUGs to prepare or revise work plans. This is an indirect help to timber production and market sales. In the Rupandehi district however, two local NGOs have been found helping CFUGs in general activities such as awareness raising and poverty reduction, but not specifically for timber production and market sales.

Thus, the DFO is found to be a very important external organisation to CFUGs regarding all activities of community forestry. Control by the DFO appeared to be strong and affecting the organisational capacity of CFUGs for timber production and market sales. One of the mechanisms of control was found to be a long administrative procedure and list of conditions set by the DFO for timber production and market sales. Furthermore, the DFO was found to be controlling things from the early stage of the work plan preparation by the CFUGs. Control by the DFOs appeared to be strong because of their forestry technician role in the community forestry and additional policing and judicial roles in the national forestry. Unlike the many roles of the DFO, the role of private firms and NGOs were found to be not constraining the organisational capacity of the CFUGs. Rather, they were found to be supportive to CFUGs for timber production and market sales.

6.3.3 Corruption

Direct questions about corruption were not asked of the respondents because it was thought that this was a sensitive issue. However, 24 out of 39 respondents expressed opinions about

corruption while responding to other questions. Therefore, corruption emerged as the third most important theme of the organisational capacity of CFUGs for timber production and market sales. At the first stage, corruption related information is analysed by summarising organisations involved in corruption. At the second stage, information is analysed under two sub-sections – corruption as a transaction cost and causes of corruption.

A list of organisations involved in corruption is summarised in Table 6.11. In this Table, four observations can be made. First, the Table clearly shows the extensive presence of corruption in timber production and market sales, from the community forests. Twenty four out of 39 respondents indicated corruption in one, or more than one, organisation.

Table 6.11 Summary of organisations involved in corruption.

Respondent	District	Respondent mentioned corruption (N)	Mention corruption in (N)*				
			DFO	CFUG Committee	PF	MB	Other
CFUG	Rup	3	2	1	1	1	0
	Uda	9	8	4	4	2	2
GO	Rup	1	1	1	1	0	0
	Uda	3	1	3	1	0	0
PF	Rup	3	3	0	0	1	0
	Uda	5	4	1	0	1	1
	Total	*24*	*19*	*10*	*7*	*5*	*3*

Note: * Some respondents mentioned corruption in more than one organisation; MB – Mao-Badi (Maoist rebels); @ Other – political parties, local Police and Clubs

Second, Table 6.11 shows that the DFO is the most corrupt organisation. Nineteen out of 24 respondents indicated some form of corruption in the DFO. The DFO is followed by the CFUG Committee, private firms, Maoist rebels, and others. Third, corruption appeared to exist not only in those organisations that were directly involved in the timber business, but also in other organisations such as the Maoist rebels, the local Police, and local Clubs. This shows rampant corruption in the timber business from community forests. Fourth, 17 out of 24 respondents from the Udayapur district mentioned corruption. Only 7 out of 24 respondents from the Rupandehi district mentioned corruption because there was no market sale. This indicates that corruption is a phenomenon of market transactions.

The following statements illustrate the rampant corruption in timber sales from community forests as well as in the timber business in general:

> *The bureaucracy has a very complicated and strong network of corruption. ---they make difficult situation to CFUG and log buyers until they get bribe. ---the log contractors are also "timber mafia". These Mafia bribe the DFO staff to take permission. ---the then Forestry Minister had to resign when he failed to fight corruption in bureaucracy (A Respondent)*

We will not have selling problem if the Forestry staff does not impose such complicated process of checking and take personal commission (PC). We can easily sale our timber at around Rs 680 per cubic foot at the CFUG gate. Thus, the main problem is the PC that is affecting us (Uda-CFUG 10)

One of the main reasons of current timber sale at lower price is CFUG Committee's readiness to sell in cheap. They take few pennies (DUI PAISA) commission from Contractors as commission for their effort (Uda-CFUG 3)

In case of timber coming from community forest, the profitability is higher compared to Government forest. There are some hidden factors in the former case. ---in the case of latter too, there is longer administrative or red-tape-ism and longer hidden stakes (Rup-GO 4)

Thus, it is evident that corruption was rampant and rooted deeply in the forestry bureaucracy of Nepal. The long bureaucratic procedure for timber production and market sales from the community forests analysed earlier, and the corruption, seemed to be supplementary to each other.

6.3.3.1 Corruption as a transaction cost

The corruption can be considered to be the main source of high transaction costs in the form of revenue leakage or hidden costs to the consumers. In order to estimate the revenue leakage, a number of questions about the prices of timber at the CFUG-gate, at the local market and in Kathmandu, and other costs such as transportation and sawing, and profitability, were asked of CFUG respondents, government staff, and private firm respondents. An estimate of the value to the market chain of a cubic metre of Sal log, from the CFUG gate in the Udayapur district to the retail shop in Kathmandu, is shown in Table 6.12.

Table 6.12 Market value chain of a cubic meter Sal log from CFUG in Udayapur.

Product stage	Market chain	Rs/m3
Logs	CFUG-gate*	10,800
	Value added tax (13%)	1,405
	Transportation cost (forest to depot)	1,400
	Margin of log-buyer (10%)	1,100
	Income tax (1.5%)	17
	Transportation cost (Udayapur - Kathmandu)@	3,500
Sawn wood	Sawn timber (conversion rate – 71%)	25,693
	Margin of sawmill (10%)	2,600
	Grand Total	28,293
	Retail price **	36,750

Note: * average figures from 16 respondents (Rs 308 per cubic foot); @ Rs100 per Cubic Foot; sawing cost is avoided because the wastage wood covers the cost; ** retail price is estimated as Rs1050 per cubic foot of sawn timber

Table 6.12 indicates that a considerable portion of the revenue is lost in the market chain because of corruption as a transaction cost. For example, the grand total cost of a cubic metre of sawn wood of Sal in a Kathmandu retail shop is about Rs28300 with the 10% margin of middlemen in the Udayapur district and the 10% margin of the Sawmill owner in Kathmandu. The actual retail price is estimated at about Rs36800 per cubic metre of sawn wood. The difference of Rs8500 per cubic metre, 30 percent of the grand total cost, is revenue leakage as a transaction cost. Further, the administrative and logistic costs of the DFO staff in assisting logging and market sales, and decision making costs of CFUG Committees and general members, were not taken into account in this estimation. If these costs are taken into consideration, then the total amount of transaction costs could be very high, more than that shown in Table 6.12.

Some respondents reported the illegal supply of Sal timber to local markets from the national forests of both districts. This was an additional indication of the high transaction costs of the timber business. The following statements illustrate the illegal supply of Sal timber from national forests as an obvious option to get round the high transaction costs of the timber business from legal sources:

> *---There is no local market for our timber because of illegal supply of timber. For example, in Rajbiraj – a local town, our timber sale is nil. The main reason is we can sell around Rs900 per cubic foot of Sal sawn wood.---In contrast, illegal sawn wood is available at Rs430 per cubic foot sourced from national forests. So, who wants to buy our timber? Perhaps, 1 percent of customers buy timber from us, but 99 per cent buy illegal timber. Furthermore, timber supply from illegal source is efficient compared to legal source. For example, smugglers can deliver timber at the door step of customer (Uda-PF 4)*

> *One of the problems that our firm currently facing is illegal timber supply in local market: timber poachers supply timber at doorstep of customer at 50 percent price of us. So, why customers buy our timber at expensive rate? As a result, it is very difficult to sell our legal timber (Rup-PF 3)*

6.3.3.2 Causes of corruption

The most common causes of corruption in the DFOs and CFUG Committees, expressed by the respondents, are summarised in Table 6.13. The most common causes of corruption in the DFOs, was believed to be weak property rights for timber. This is followed by the technical role of the DFO, power, and the corrupt tradition. In the case of CFUG Committees (Table 6.13), the most common cause of corruption reported was greed, followed by the financial burden imposed by the DFO staff, the lack of incentives and the lack of education of the members.

Table 6.13 Causes of corruption in the DFO and CFUG Committees.

In the DFOs (N)		In the CFUG Committees (N)	
Weak property rights for timber	7	Greed in Executive Committee	4
Technical role or checking	5	Financial burden of DFO staff	2
Power (prosecution and withdrawal)	4	Lack of financial incentive	2
Corrupt tradition from the past	2	Lack of education in members	1

The main cause of corruption in the DFOs appeared to be the CFUGs' weak property rights for timber produced from the community forests. The weak property rights for timber have already been discussed in section 6.3.1. Because of the weak property rights, the DFO staff might ask log buyers for bribes or vice versa. Furthermore, as shown in Table 6.11 the Maoist rebels, other organisations, and on route checking posts appeared to be asking for bribes. The following statements illustrate that the weak property rights have been the main cause of corruption:

> *CFUG is an autonomous organisation and can sell timber as it likes, but it is totally captured by the DFO (Uda-PF 1)*
>
> *We are forced to pay money to many organisations despite we do not have to pay legally. But we do not want to invite risk as there is nothing certain. Thus, we have property right related problems over resource (Uda-PF 3)*
>
> *All our property rights are controlled by DFO. Some degree of control is necessary to ensure check and balance. However, their control is motivated from corruption intention (Rup-PF 2)*

The second most common cause of corruption in the DFOs appeared to be the technical role of the DFOs. Five out of 39 respondents said that the forestry technical role of the DFOs was the starting point of corruption in the DFOs. Additionally, two respondents mentioned the financial burden imposed by the DFO staff, as a cause of corruption in CFUG Committees. The Forest Act 1993 and the Forest Regulations 1995 have stated that the CFUGs could manage their forests based on the working plan and technical support from the DFOs. The aim of the Act and the Regulations is to ensure technically sound and sustainable forest management. However, the DFO staff appeared to be using this provision for personal gain, as an allowance, which is illegal and can be considered a bribe. The following statements illustrate that the technical assistance from DFO staff is often paid for by the CFUG Committees, which is illegal and a cause of corruption in CFUG Committees:

> *We have to provide daily allowance Rs 100 to a Forest Guard and Rs 150 to a Ranger. However, they do not give receipt to us probably because they are not allowed to take such money as they also get food allowance (Rashan Bhatta) from Government (Uda-CFUG 9)*

> *--- Additionally, we have to provide allowance, tea and snacks to the Officials when they visit us. Usually, two to three Officials are included in a visit. The list of bills keeps on increasing from our pocket. We can not show all these bills to our members and can not get reimbursement. So, we are forced to take some personal commission from the sale (Uda-CFUG 10)*

The third cause of corruption appeared to be the power of the DFO. Based on the Forest Act 1993, the DF Officer can prosecute anybody who offends the national forest rules. In the case of community forestry, the Officer can withdraw the community forest from the local people if it is found that they have not fulfilled the conditions of the working plan, and their actions caused environmental damage. These powers are believed to be a cause of corruption in the timber business of community forestry. The following statements illustrate that the prosecution and forest withdrawal powers of the DF Officer are contributing to corruption:

> *In my view, the present clause in forestry policy (Forest Act 1993) – the automatic withdrawal of forest if found deviation (or forest destruction) from working plan. This clause has become like a milking cow for DFO staff (Rup-CFUG 6)*

> *There will be a prosecution if the CFUG operate drastically different than the work plan. Such provision is put while making their work plan (Rup-GO 2)*

In the case of the CFUG Committees, the main causes of corruption appeared to be greed and the lack of incentive. As mentioned earlier, in control by the DFO Section 6.3.2, the long and complicated administrative procedures for logging and market sales seemed to be contributing to the CFUG Committee members spending a lot of private money and time on business. Generally, they are supposed to work voluntarily. To recover the personal expenses and to provide some incentives for work, the Committee members seemed to be forced to take bribes. The following statements illustrate how these causes contribute to corruption:

> *---Executive Members do not get salary and allowances for their work. Therefore, they are forced to do some kind of corruption for their financial sustaining (Uda-GO 1)*

> *One of the main reasons of current timber sale at lower price is CFUG Committee's readiness to sell in cheap. They take few pennies (DUI PAISA) commission from Contractors as commission for their effort (Uda-CFUG 3)*

Thus, corruption appeared to be an important theme of the organisational capacity of CFUGs for timber production and market sales. Corruption appeared to be in the DFOs, in the CFUG Committees, private firms, Maoist rebels, and other organisations – in fact, in the whole timber business. The rampant corruption in the timber business is believed to negatively affect the whole organisational capacity of CFUGs. As a result, transaction costs of the timber business appeared to be very high. The main causes of corruption appeared to be the weak

property rights for timber and the multiple and powerful roles of the DFO as forestry technicians, in policing, and in the judiciary. The main causes of corruption in CFUG Committees appeared to be personal greed and the lack of personal incentives.

6.3.4 Policy constraints

As guided by the literature, government policy is important for the organisational capacity of CFUGs for timber production and market sales. The success of the community forestry programme in terms of people participation and forest condition improvement, is credited to the favourable government policy on community forestry. However, this section is devoted to the analysis of the government policy for timber production and market sales from the community forests. In order to examine this, a number of questions related to government policy were asked of the CFUG respondents and government staff.

Government policy appeared to be constraining the organisational capacity of CFUGs on two levels: inconsistent policy about external sales; and unfavourable policy about enterprise development. Before going to these two policy-level constraints, perceptions of respondents about forest management objectives are analysed. One of the main reasons for doing this is that government policy for community forestry might be reflected in these perceptions. Further, these perceptions will be helpful in analysing further, the policy constraints.

Two questions related to forest management objectives were asked of CFUG respondents and government staff. These questions were not asked of private firm respondents because it was assumed to be irrelevant to them. The second question was asked of CFUG respondents only to double check if the CFUGs had any additional objectives.

> What are the CFUG's objectives (interests) of community forestry management?
>
> Do the CFUG have any disagreements, particularly on growing, harvesting and selling timber?

The respondents' views are summarised in Table 6.14. This Table clearly shows that local use and forest protection were the most common forest management objectives. The former and the latter objectives were expressed by 23 and 20 respondents respectively out of the 27 respondents. The other objectives were found to be income generation, community development and poverty reduction. The local use of forest products, community development, and poverty reduction objectives can be considered to be welfare oriented objectives of forest management. The forest protection objective can be interpreted as being a pro-conservation forest management objective.

Table 6.14 Forest management objectives - Respondents' views (N = 27*).

Respondents	District	Forest management objectives**				
		Local use of forest products	Protection of forest	Income generation	Community development	Poverty reduction
CFUG	Rup	8	7	0	0	2
	Uda	7	7	5	1	0
GO	Rup	4	3	0	1	1
	Uda	4	3	1	3	2
	Total	*23*	*20*	*6*	*5*	*5*

Note: * 4 Respondents were not asked because of time constraint; ** Open ended question – Respondents were allowed to answer more than one objective

The following statements illustrate that the forest management objectives are conservation and welfare oriented:

> *The main objective of community forestry is to improve forest condition while providing concurrent benefit to CFUG. Community forest is given to CFUG mainly to protect--- (Rup-GO 3)*
>
> *CFUGs main objective is to improve forest condition and get more forest products from forest (Uda-GO 2)*
>
> *The sole objective of community forest management is to supply timber and firewood to its members at the possible lowest price (Rup-CFUG 1)*
>
> *The objective of community forest is to supply forest products to members. The government brought the community forestry programme to protect forest, therefore, forest protection is another objective (Uda-CFUG 3)*

Compared to the conservation and welfare oriented forest management objectives, only 6 respondents from the Udayapur district stated that income generation was the objective (Table 6.14). This objective only, can be considered to be profit maximisation. Other welfare and conservation oriented objectives can be viewed as rival to the income generation or profit maximisation objective. Based on these findings, the initial assumption of CFUGs as a profit maximising social firm is questionable.

6.3.4.1 Inconsistent policy about external sales

One of the main policy constraints responsible for the weak organisational capacity of CFUGs appears to be the inconsistent policy about the external sale of timber. Ten out of 25 respondents (Figure 6.1) stated that the government's new policy (the Forest Sector Policy 2000) is inconsistent with other policies such as the Forest Act 1993 and the Master Plan of Forestry Sector (MPFS) 1989. For example, the MPFS (1989) and the Forest Act 1993 were favourable to community forestry. Based on these policy frameworks, a CFUG can produce, transport and sell timber freely inside the country. In contrast to these, the Forestry Sector

Policy (FSP) 2000 restricts the CFUGs of the Terai region from selling timber freely. In fact, the Forest Regulations 1995 has also put on a condition of emphasizing internal use of timber before external sales. The Operational Forest Management Plan (1996) has defined productive Sal forests of most of the Terai and Inner-Terai regions as government "block" forests. This policy constrained the DFO, from handing over productive forests to local communities. Furthermore, the FSP 2000 has brought in more tough conditions over external sales. For example, the FSP (2000) states " the main objective of community forest is to fulfil the basic needs of local communities for fuel wood, fodder, and small timber, 40% of the earnings from timber sales will be collected by the government for programme implementation when surplus timber is sold by the CFUGs", and is therefore a new concept in forest management in Terai, Churia Hills, and Inner-Terai. The following statements illustrate the inconsistent policies about the external sales of timber:

> *There is inconsistency in government policies. ---The Forest Act 1993 was based on the Master Plan of Forestry Sector which was liberal for community forestry. ---The recent government policies (OFMP 1996 and FSP 2000) are to manage good forest of Terai as"block forest" under government management instead of handing over to CFUG. Based on the FSP 2000 the CFUG must fulfil internal demand first prior to external sale (Rup-GO 2)*

Other respondents mentioned either they were not concerned or there was no policy constraint. For example, all 7 interviewed CFUG respondents of the Rupandehi district indicated that the policy about external sales was irrelevant to them as these CFUGs have been producing only small amounts of timber for internal sale only. Three out of 25 respondents said there was no policy issue regarding external sales. The rest, five respondents, said the DFO constrained market sales of timber from community forests.

6.3.4.2 Unfavourable policy for timber enterprise

Government policy for timber enterprise development is evaluated in this sub-section. For this, the following two questions related to policy constraints were posed to CFUG respondents and government staff:

> Do you see any policy constraints or external barriers to produce timber and run a timber enterprise by the CFUG? What are they, explain?
>
> If the CFUG have encountered problems what was the cause, for example, change in policy or personal interpretation of the government staff?

From the response of respondents it appeared that policy was unfavourable for enterprise development in community forestry. Eight out of 25 respondents mentioned two types of unfavourable policy for enterprise development. First, they said that the registration of an

enterprise was a complicated process. For example, in order to get a licence for an enterprise, from the District Cottage and Small Industry Office, a CFUG or groups of CFUGs are required to have a 'no objection letter' from the DFO and the local Village Development Committee or Municipality.

Second, apparently there was a 'no policy' situation for personal investment into an enterprise. CFUGs could borrow money from a financial institution, against only the timber, which seemed to be impractical because the lender usually holds the selling rights of collateral. The following statements illustrate the 'no policy' situation of private investment in timber production and enterprise development:

> *---One of the main reason of no investment of private property in community forest is, no clear policy of private investment in community forestry (Uda-CFUG 9)*
>
> *---there is no policy of private property investment and we don't know technicality of it. For example, policy is silent on whether or not people can invest private property in community forestry. To have this type of policy it will take long time. This is a concept of privatisation, which requires a long process (Rup-GO 2)*
>
> *The common trend in community forestry is that they perform their duty and share benefit in collective way. --- It will become complicated if one or more members invest more and seek benefit more than others. This is not the concept of community forestry (Uda-GO 2)*

Similar to the subsection 6.3.4.1, other respondents said either that this was not relevant to them or there were no policy constraints for timber enterprise development. Mainly, the government staff expressed the view that there were no policy constraints or unfavourable policies for timber enterprise. For them, the economies of scale, initial investment, and human capital, were the key issues responsible for the 'no start' of a timber enterprise. These are valid issues and will be analysed in the institutional barriers for contracting and cooperative arrangements, Chapter 7.

Thus, policy constraints appeared to be an important theme for the organisational capacity of CFUGs for timber production, market sales and enterprise development. Perceptions of respondents about forest management objectives seemed to be conservation and welfare oriented instead of profit maximisation. This finding might have an effect on timber production and market sales. Similarly, government policy about external sales was found to be inconsistent and constraining timber production and market sales. More specifically, the FSP (2000) appeared to be inconsistent with the Forest Act 1993 and MPFS (1988) and was constraining market sales. Finally, the government policy about enterprise development

seemed to be unfavourable because of the complicated process of registration and apparently the ‘no policy’ of capital raising and private investment for enterprise development.

6.3.5 Lack of internal resources

In this section, important internal resources that determine the organisational capacity of CFUGs for timber production and market sales are analysed. Internal resources refer to the forest resource, human capital, physical resource, and the financial capital of a CFUG in organising logging and market sales. A list of open-ended questions related to these resources were directed primarily to CFUG respondents and government staff, to examine whether there was an effect of these resources on log production and market sales. The majority of these questions were not considered to be relevant to private firm respondents. However, some questions were asked in a modified form based on their own resources context, instead of that of a CFUG.

From the analysis of views of the respondents, lack of internal resources appeared to be the organisational capacity theme for CFUGs, for timber production and market sales. More specifically, low forest endowment, lack of financial capital, and lack of skills in the Executive Committee, were found to be problematic as sub-themes of the lack of internal resources. Unlike these resources, physical resources and skills of general members were found to be not an issue in the CFUGs. Low forest endowment, lack of financial capital, and lack of skills in the Executive Committee are analysed below.

6.3.5.1 Low forest endowment

As mentioned earlier, this chapter is focussed on the organisational capacity of CFUGs for timber production and market sales. So, to find out the determining factors for timber harvest and market sales, was the main interest of this sub-section. For this, different questions related to the amount of timber produced and market sales, the trend, and reasons for the production and market sales, or no production and no market sales, were asked of the CFUG respondents, government staff and private firm respondents. CFUG respondents were asked the following questions:

> How much timber was produced by the CFUG in the last fiscal year?
>
> If the CFUG did not produce timber last year what were the reasons?
>
> If the CFUG produced timber how much was sold to the market? If not, why?

To elicit the views of government staff and private firm respondents, slightly modified questions were asked that referred to general information rather than specific CFUGs. For government staff the following questions were asked:

What is the general trend of CFUG timber harvesting and sale in the last three years?

What do you think about the availability of timber in CFUGs, for example, size of forest?

For private firm respondents, the following questions were asked:

What are the sources of timber?

What are the problems/risks of getting supply from different sources?

What do you think about the importance of community forests get supply to your firm?

The views of respondents are summarised in Table 6.15. This Table clearly shows that the forest endowment per household was the key factor for market sales of timber. All 9 CFUGs that were able to sell timber to the market in the year 2006/7 have more than 0.5 ha forest endowment. They were from the Udayapur district only. In contrast, 12 CFUGs were unable to sell timber – and the majority of them had the lowest forest endowment. Ten out of 21 CFUGs, 9 from the Rupandehi district and one from the Udayapur district have a low forest endowment (not in terms of the forest area but in poor forest stock), and are responsible for less production of timber and eventually, less to the market sales. As discussed in Section 6.3.2, on control by the DFOs and weak property rights for timber themes, CFUGs are required to have surplus timber to internal demand before they can go to the market sales. The remaining two CFUGs of the Udayapur district were unable to sell timber to the market in this year because of internal disputes and the lack of skills of the newly elected Executive Committee.

Table 6.15 Forest endowment and timber sale in 2006/07.

Forest endowment		Timber sold to market (N)	Other factors
ha/household	N		
More than 2	3	1	Low stock, internal dispute
1.51 – 2.0	1	1	
1.10 – 1.5	5	4	Lack of skills of the Exec. Committee
0.50 – 1.0	5	3	
Less than 0.5	7	0	
Total	*21*	*9*	

The following statements further illustrate how the low forest endowment, in terms of a small area and/or a degraded forest, particularly in the Rupandehi district, was responsible for the low production and market sales:

> *We have a very small forest, therefore, small production---(Rup-CFUG 6)*
>
> *---size of community forest is small, therefore the small amount of timber production and can meet internal demand only. The production of Sal timber is further low (Rup-GO 1)*
>
> *We do not have surplus timber to sell outside because of huge number of households (Rup-CFUG 1)*
>
> *---Here, the internal demand of timber is so high – any amount can be consumed. If we allow CFUGs to cut green trees, forest will be finished soon (Rup-GO 3)*

Thus, low forest endowment was found to be responsible for the low timber production and market sales from community forests. One of the main reasons for this is, for market sales, CFUGs are required to have surplus timber to internal demand.

6.3.5.2 Lack of financial capital

In order to find out whether the financial capital and investment is limiting the organisational capacity of CFUGs for timber production and market sales, a number of questions were asked of CFUG respondents and government staff. Again, CFUGs' financial and investment related questions were not asked of private firm respondents, assuming them to be not relevant to them. The first financial capital question asked was:

> Does the financial capital of CFUG limit in harvesting and selling timber? Please explain.

Additionally, the following two questions related to investment were asked of CFUG respondents and government staff under the topic of property rights:

> What are the three most important investments necessary to scale up timber production or increase productivity at the CFUG?
>
> Are you making the investment you identified above? Yes/No
> If not, what stops you investing, explain?

For government staff, the first question was the same. The second question was slightly modified:

> In your view, how a CFUG can raise above investments? What are the risk/problems of above investment and why?

Financial capital as an initial investment for logging and market sales appeared to be a problem, particularly if logs were being produced for market sales. The initial investments were found to be used for logging, transporting to the depot, and administration purposes such as decision making, obtaining permits from the DFO, and even at the initial stage of work plan preparation. All respondents from the Udayapur district indicated that there was inadequate financial capital. In the Rupandehi district, only two respondents indicated this was a problem however. Others indicated that this was not an issue as they were harvesting timber for internal sale only.

To overcome this problem, 7 out of 9 CFUGs that sold timber to the market were found to be borrowing money from the log buyers or saw millers. The following statements illustrate that CFUGs have inadequate financial capital and borrow from the private firms:

> *Initially we harvested about 4000 cubic feet of logs borrowing money for logging and transportation in advance from contractor (Uda-CFUG 11)*
>
> *We don't have enough financial capital in our group so we borrowed money from the contractor for timber harvest and transportation (Uda-CFUG 12)*
>
> *CFUGs are borrowing money from private firms or from own members, especially at the initial stage. They spend this money even for the preparation of WP (Uda-GO 2)*

One of the main reasons for the lack of financial capital in CFUGs was what appeared to be a 'no policy' situation of private investment in community forestry in general, and in logging and enterprise development in particular. This issue has already been discussed in the section on unfavourable policy about enterprise development.

The most common necessary investment, expressed by 7 out of 25 respondents is roads. The other common investments needed are: modern harvesting equipment like power chainsaws, movable sawing equipment and tractors; silvicultural activities like thinning and pruning; sawmilling and furniture factories; and skill development training. These investments were stated by 5, 3, 3 and 2 respondents respectively. However, these investments can be considered as long term investments and believed to not impact on the production and market sales of timber in the year 2006/07. For example, 15 out of 25 respondents said that the lack of physical capital has not impacted on the timber production and market sales, when asked if the lack of physical capital limited their ability to produce timber.

The lack of financial capital appeared to be a cause of revenue loss from timber. This is believed to eventually affect the organisational capacity of CFUGs for timber production and market sales. As mentioned in Chapter 5, the private firms or local contractors were found to be involved in logging and arranging market sales on behalf of the CFUG Committees. The

involvement of contractors was found in all 7 CFUGs mentioned above that did not have enough financial capital to arrange logging and market sales on their own. As a result, these contractors seemed to be able to make auction sales less competitive in their favour and therefore make a revenue loss to the CFUGs. The following statements indicate how these contractors advance money in exchange for timber from community forests:

> *We observed contractor's monopoly if we borrow money from them for logging. Therefore, to avoid this we raised money and involved ourselves in taking permissions. We were able to sell our timber at higher price (Uda-CFUG 7)*
>
> *We did not have enough financial capital in our group so we had to borrow money from the log buying contractor to harvest and collect timber. So, we were obliged to sell our timber to them at cheap (Uda-CFUG 12)*
>
> *If we supply loan to CFUGs there will not be a competition from other private firms ---we can buy timber at cheap price (Uda-PF 4)*
>
> *There is higher competition when we buy timber from government auction compared to community forest (Uda-PF 2)*

Thus, lack of financial capital was a problem to CFUGs for logging and market sales. Because of this problem, CFUGs appeared to be forced to either borrow money from logging contractors or forced to arrange logging and market sales through logging contractors. This leads to contractors being able to lessen competition, resulting in revenue loss to the CFUGs.

6.3.5.3 Lack of skills in the Executive Committee

As guided by the literature, several questions related to human resources were asked of CFUG respondents and government staff in order to examine whether the human resources have an effect on the organisational capacity for timber production and market sales. Human resources are referred to as the training or experience of general members and committee members of CFUGs, for timber production and market sales. General member training refers specifically to labour skills for logging, transporting, and sawing. Committee members' training refers specifically to the managerial skills required for timber production and market sales. For example, managerial skills include decision making, organising labour, managing physical and monetary capital, coordinating external organisations such as the DFOs, NGOs and private firms in arranging logging and market sales.

From the statements of respondents, lack of skills in the Executive Committees appeared to have some impact on timber production and market sales. Unlike this, the skills of general members seemed not to affect the timber production and market sales.

To examine the effect of skills of the Executive Committee members in organising timber production and market sales, the following questions were posed to CFUG respondents and government staff:

> Do the committee members have experience and skills to make decisions and manage general members in the CFUG for timber production and market sales?
>
> Do the committee members have experience and skills in coordinating with external organisations such as the DFO and private firms for timber production and market sales?

The lack of skills in the Executive Committees appears to have some effect on the timber production and market sales. Eight out of 25 respondents stated that because of the lack of skills in the Committees, they could not manage internal disputes and could not coordinate the DFO and private firms to organise logging and market sales. The following statements illustrate that the lack of skills in the Executive Committees has some impact on the timber production and market sales:

> *We did not harvest timber last year because of new Executive Committee. The Committee has no experience of coordinating the DFO and private firms (Rup-GO 4)*
>
> *We did not have enough experience because we are new therefore we might have done some mistakes (Uda-CFUG 11)*
>
> *We committee members have some experience of decision making and internal group management. We also have experience of coordinating the DFO. However, we have very little experience of timber sales (Uda-CFUG 1)*

In summary, the lack of skills in the Executive Committees appeared to have some negative effect on the organisational capacity of CFUGs for timber production and market sales. Because of the lack of skills in the Committees, there appeared to be problems of internal dispute management, and coordinating with the DFO and private firms. Unlike the Executive Committee, human resources in terms of general members' skills, was found to be not constraining the organisational capacity of the CFUGs.

6.3.5.4 Summary

The effect of internal resources on the organisational capacity of the CFUGs in terms of forest resources, human capital, physical resources, and financial capital were examined in the context of timber production and market sales, in this section. Lack of internal resources in terms of low forest endowment, lack of financial capital, and lack of skills in the Executive Committee appeared to be affecting the organisational capacity of the CFUGs. Unlike these resources, the skills of the general members of the CFUGs and the physical capital seem to be not constraining the organisational capacity of the CFUGs.

The low forest endowment seemed to affect the low production of timber. This was eventually found to be affecting market sales because CFUGs are required to have surplus timber before selling to the market. The lack of financial capital in CFUGs appeared to force them to borrow money from logging contractors. These contractors were found to be able to lessen the competition in timber auction sales, resulting in revenue loss to the CFUGs. Finally, the lack of skills in the Executive Committees appeared to cause weak organisational capacity in managing internal disputes and in coordinating with the DFOs and private firms that eventually affects timber harvest and market sales.

To address these issues of lack of internal resources, the potential for contractual relationships between the CFUGs and the private firms, and the cooperative arrangements between CFUGs, are analysed in Chapter 7.

6.4 Summary of Chapter

In this chapter, the organisational capacity of CFUGs in terms of internal resources, property rights for timber, relationships with external organisations and government policy, was examined for timber production and market sales, using qualitative data in the form of personal interviews of key respondents. Among these, weak property rights for timber, control by the DFOs over CFUGs, corruption, policy constraints, and the lack of internal resources, appeared to be organisational themes.

Property rights for timber are found to be weak because of weak logging rights, weak processing rights, weak selling rights, and weak revenue use rights. CFUGs were asked to obtain logging permits from the DFOs even to harvest amounts specified in the work plan. In the Rupandehi district, CFUGs were allowed to harvest only dead and fallen trees. Likewise, processing rights were found to be weak because the CFUGs were not allowed to process timber for the market. As a result, CFUGs were found to be selling only logs, not finished products such as sawn timber and furniture. Similarly, the selling rights were found to be weak, because CFUGs were only allowed to sell timber, surplus to internal demand, by the sealed tender bidding auction sale process. As a result, the market sales were apparently nil in the Rupandehi district. Finally, the CFUGs rights over timber revenue were found to be weak because they were not only asked to obtain a permit from the DFO, but were also guided by the DFO in the use of the revenue raised by selling timber.

The DFOs were found to be a very important organisation to the CFUGs. Control by the DFOs was found to be strong and affected the organisational capacity of the CFUGs for timber production and market sales. One of the main mechanisms of DFO control appeared to

be the long administrative procedure for timber production and the conditions set by the DFOs for market sales. Another mechanism of DFO control is believed to be through the preparation of the work plan. The reasons for the strong control of the DFO are seemed to be the multiple and powerful roles of the DFO as the forestry technicians, in policing, and in the judiciary. Unlike the role of the DFO, roles of private firms and NGOs were found to be supportive for timber production and market sales, especially in the Udayapur district.

Corruption appeared to be evident in the DFOs, in CFUG Committees, in private firms, and in other organisations, indicating corruption in the whole timber business. High transaction cost of the timber business was found as a result of the extensive corruption. The main causes of corruption were believed to be the weak property rights for timber, the multiple and powerful roles of the DFO, personal greed, and the lack of personal incentives to the CFUG Committees. As a result of the rampant corruption, the organisational capacity of CFUGs is believed to be weak.

Further, Government policies about timber production, market sales and enterprise development were found to be constraining or unfavourable to the organisational capacity of CFUGs. Firstly, perceptions of respondents about the forest management objectives were found to be pro-conservation and pro-welfare instead of profit maximisation. Secondly, the government Forest Sector Policy 2000 appeared to be inconsistent with the Forest Act 1993 and the Master Plan of Forestry Sector 1989 because the former discourages the external sales of timber from the community forests. Thirdly, government policy for enterprise development appeared to be unfavourable because of a complicated process of enterprise registration and apparently a 'no policy' situation of private investment into the enterprise.

Finally, a lack of internal resources in terms of low forest endowment, lack of financial capital, and a lack of skills in the Executive Committee appeared to affect the organisational capacity of CFUGs for timber production and market sales. One of the main conditions for external sales was that the CFUGs required a surplus of timber. The low forest endowment simply does not allow CFUGs to produce surplus timber. Because of low forest endowment, the market sales in the Rupandehi district was apparently nil. Lack of financial capital appeared to be forcing CFUGs to borrow money from contractors in exchange for logs. The contractors appeared to be able to lessen the competition at the auction sales, resulting in a loss of revenue to the CFUGs, affecting the organisational capacity indirectly. Finally, a lack of skills in the Executive Committees appeared to be limiting the organisational capacity, because the Committees were not able to manage internal disputes and coordinate the DFOs and private firms to arrange logging and market sales. Other resources such as physical capital

and skills of general members of the CFUGs were found to be not constraining the organisational capacity of CFUGs for timber production and market sales.

To address these organisational capacity themes, particularly the lack of internal resources and economies of scale issues for processing and selling timber, the potentials and constraints for contractual relationships between CFUGs and private firms, and cooperative arrangements between CFUGs, are analysed in Chapter 7.

Chapter 7
Contracting and Cooperative Barriers

7.1 Introduction

The preceding chapter examined the organisational capacity of a CFUG for timber production and market sales. The weak organisational capacity in terms of weak property rights over timber, strong control by the DFO, corruption, government policy constraints, and lack of internal resources, were responsible for the small production of timber from community forests. The third objective of this study is to investigate the institutional barriers for contracting and cooperative arrangements of CFUGs, for vertical integration with the market. Therefore, the aim of this chapter is to analyse the institutional barriers for contracting and cooperative.

This chapter is organised into three sections. Section 7.2 deals with the contracting between CFUGs and private firms. This section is further divided into two subsections: respondents' views (7.2.1), and constraints of contracting (7.2.2). Section 7.3 analyses cooperative arrangements in CFUGs. This section too is divided into two subsections: respondents' views (7.3.1), and constraints of cooperative arrangements (7.3.2). Finally, Section 7.4 draws a chapter summary.

7.2 Contracting

The aim of this section is to analyse barriers for formal contracting between a CFUG and private firms such as log buyers, saw millers, and timber wholesalers/retailers. Contracting is a formal agreement made between a CFUG and a private firm for the mutual benefit of transactions. Before starting analysis of contracting barriers, it is worthwhile to know whether there were any existing contractual arrangements between CFUGs and private firms. Likewise, it is also important to know respondents' views about contracting. There is no reason for contracting if respondents consider there is no benefit from contracting. In contrast, contracting barriers become important if respondents consider there are benefits from contracting.

None of the 21 CFUGs interviewed had a formal contract (written contract) with private firms. However, 8 out of 21 CFUGs had borrowed money from private firms for logging and market sales arrangements, in a verbal agreement, money for timber exchange. This

arrangement can be considered an informal contract. Respondents' views about contracting are analysed below.

7.2.1 Respondent's views

As guided by the literature, contracting could be beneficial to CFUGs for raising financial capital, accumulating human resources, attaining economies of scale for processing and transportation, and securing sales. For private firms it would be beneficial to secure supply and reduce transportation and other costs. In order to analyse respondents' views on contracting, 29 respondents from all organisations (CFUGs, government organisations and private firms) were interviewed by asking the following questions:

> Do your see any benefit of a contractual arrangement between the CFUG and private firms? What are they and why?
>
> If you do not see benefit of contractual arrangement, please explain why?

The rest were not asked simply because of time constraints. Respondents' views are summarised in Table 7.1. These respondents were found to have an awareness of contracting and its benefits and costs.

Table 7.1 Do you see any benefit of contracting between CFUGs and private firms?

Respondents	District	Contracting benefit (N)				Main reasons of contracting	
		Yes	No	NA	50-50	Advantage	Disadvantage
CFUG	Rup	0	3	2	0	-	Low production; not allowed
	Uda	6	2	0	0	Easy sale; capital injection	PF opportunistic; low price
GO	Rup	2	0	1	1	Reduce corruption; capital	Auction sale
	Uda	3	0	0	2	Capital; easy sale	Irreg. production; auction sale
PF	Rup	3	0	0	0	Raw material: Capital; easy sale for CFUG	-
	Uda	4	0	0	0	Raw material supply; jobs to PF	-
	Total	*18*	*5*	*3*	*3*		

Note: N – number of respondents; NA – not allowed; 50-50 – benefits and costs equal

Table 7.1 shows that most of the respondents consider contracting would be beneficial for timber production and market sales from community forests. Eighteen out of the 29 respondents believed that there were benefits for contracting. Only 5 respondents said that there were no benefits for contracting. Also, 3 respondents said they were "Not Allowed". They may have a positive attitude to contracting, but were constrained by something. Finally,

3 respondents said “50-50”, which could be interpreted as them being cautious people, as contracting has both benefits and costs.

Another observation from Table 7.1 is that respondents from the Udayapur district were more positive to contracting compared to the respondents of the Rupandehi district. For example, 13 out of 18 respondents who said “Yes” were from the Udayapur district. This is not surprising because CFUGs in this district were found selling logs to private firms with informal contracts as mentioned above. In contrast, CFUGs in the Rupandehi district were found to be not selling to the market, because of their small production and large internal demand. For them, contracting seemed to be irrelevant at least for now, if not in the future.

The most common advantages for contracting according to the respondents’ views were what appeared to be the easy selling of the timber and capital injection into the CFUG (Table 7.1). In contrast, the disadvantages of contracting seemed to be the opportunistic nature of private firms and the contracting obligation of selling logs at cheap prices. Other factors such as auction sales and irregular production were constraints rather than disadvantages of contracting. This will be further discussed in constraints of contracting.

Furthermore, some government staff believed that contracting may reduce the corruption in the CFUG Committees as it will increase transparency. Private firm respondents viewed contracting as beneficial, not only to CFUGs but also to them. Contracting could guarantee a supply of raw materials.

Thus, all interviewed respondents were found to be aware of the advantages and disadvantages of contracting. The majority had positive views towards contracting and believed contracting to be beneficial to CFUGs as well as to private firms. Some respondents had negative views or believed there to be constraints for contracting. The constraints of contracting are analysed in the following sub-section.

7.2.2 Constraints of contracting

It is evident from the above, that contracting is viewed as beneficial to CFUGs for log production and market sales. Despite their positive view of contracting, none of the CFUGs had started formal contracting with private firms. Thus, there seemed to be constraints of contracting. This subsection is focussed on analysing contracting constraints.

In order to find out constraints of contracting, respondents were asked the following two follow on questions from the preceding subsection:

If you see benefit but have not started, what are constraining issues to make such contractual arrangement?

Tell me your view, how this (these) constraining issue(s) can be reduced?

Similar to the organisational capacity of CFUGs (Chapter 6) respondents' views are analysed using NVivo 8 software. Respondents' views in the textual forms are coded and put under nodes until the common themes emerge. Additionally, the simple frequency count is used in the analysis. Common themes, as constraints of contracting based on frequency order, are illustrated in Figure 7.1.

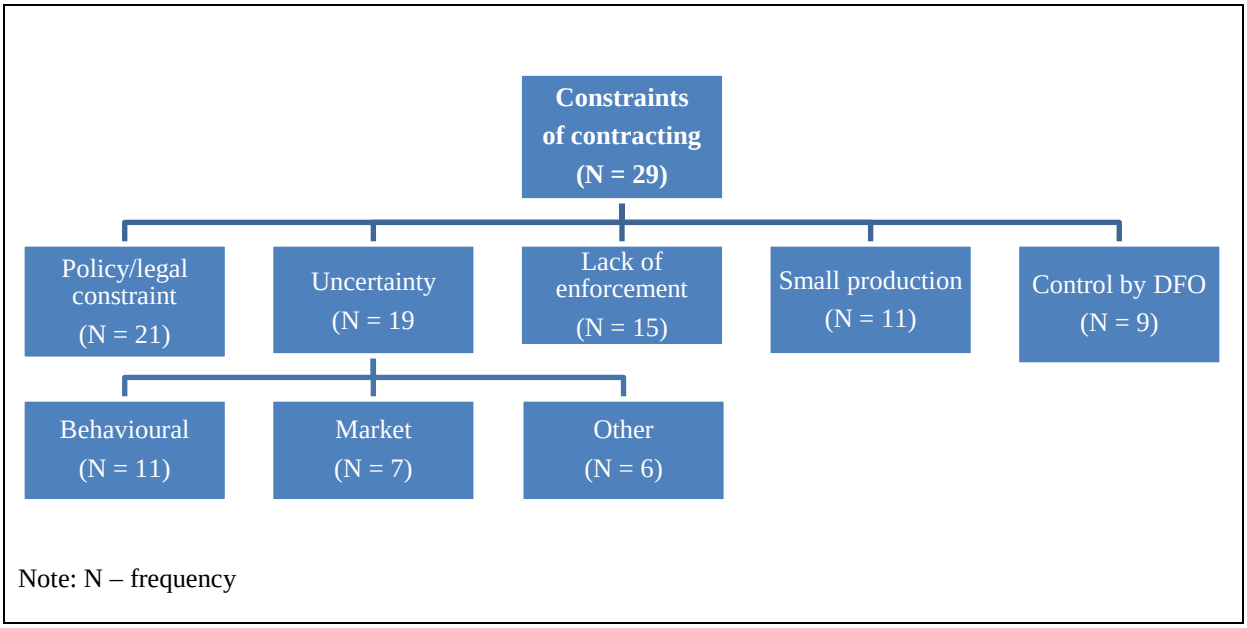


Figure 7.1 Contracting constraint themes.

The common themes as constraints of contracting were found to be in order: policy/legal constraints; uncertainty; lack of enforcement; small production; and the controlling role of the DFO. These constraints are further analysed separately below. Additionally, there were other constraints expressed by a few respondents like corruption and a lack of asset specificity,. The issue of corruption has already been discussed in Chapter 6. The lack of asset specificity in timber production was because CFUGs used very low technology in logging, transportation and debarking. They use axes, hand saws, ropes and manual labour for logging. It was evident that asset specificity was not an issue in logging. Therefore, the issue of asset specificity is dropped from the analysis.

7.2.2.1 Policy/legal constraint

Policy/legal constraint was believed to be the main limiting factor for contracting. Twenty one out of 29 respondents viewed this as a constraint. The remaining 8 respondents said either they did not know, or policy was not an issue. Twelve out of 21 respondents believed that there was even a legal restriction for contracting. The current practice of selling logs from community forests through auction was considered to be evidence of the legal restriction. The following statements illustrate the legal restriction for contracting:

> *We are not allowed to do contracting by law (Rup-CFUG 9)*
>
> *I think, law has forbidden for long term contracting with private firm (Uda-CFUG 1)*
>
> *Perhaps, they are called 'users' because they are not allowed to sell timber. If they can not sell timber there is no point of contracting. Furthermore, according to the current policy CFUG can sell only through auction. This prohibits contracting with private firm (Rup-GO 1)*
>
> *There is no clarity on Forest Laws whether a CFUG can sell timber and other forest products to private firms without an auction (Uda-GO 2)*
>
> *According to the present policy CFUGs are not allowed to do contracting with us (Rup-PF 1)*

Respondents might be referring to the Forest Act 1993 and Forest Product Auction Sale: Administrative Procedure 2003, as current law. Based on the latter document, which was actually prepared for forest product auction sales from government managed forests, instead of community forests, respondents believed that community forest sales had to be made through the auction system.

Five out of 21 respondents expressed the view that the policy for contracting is unclear. This then is a policy constraint for contracting. The following statements illustrate the unclear policy for contracting:

> *--- I see policy constraint. Sawmills are private property. Our organisation is community property. Therefore, there is no clear policy whether community organisation like ours can make a contract with private firm (Uda-CFUG 8)*
>
> *Legally it is not clear that CFUG can make a long term contract with private firm (Rup-PF 3)*

There is a Contracting Law 1996 – primarily designed for contracting between private firms or individuals (Shrestha, 2006). There appeared to be confusion as to whether a CFUG, which is neither a private nor a state firm but a social firm, can make a contract with a private firm within the framework of the Contract Law 1996. The Contracting Law 1996 and the Forest Act 1993 are silent about contracting by a CFUG with private firms or individuals.

Four out of 21 respondents said that they were not even aware of any contracting law or policy. The following statements illustrate their unawareness of contracting law:

> *There is no contracting law in my view (Uda-GO 1)*
>
> *We do not have policy of making long term contract with CFUG (Uda-PF 2)*

Despite many respondents believing that there were legal restrictions or policy constraints for contracting, it was evident that a contract could be organised by a CFUG by putting this scheme into the work plan. This indicates that there was no legal restriction for contracting. However, getting the approval of the District Forest Officer would be a challenge. The following statement illustrates that contracting can be done by putting it in the CFUG work plan:

> *---this is not a big deal. CFUG can make a contract with private firm. The process of community forestry is to prepare WP and get approval from district forestry chief (DFC). The contractual arrangement can be put into the WP and approved in DFC is convinced (Rup-GO 4)*

Thus, policy/legal constraint was found to be one of the main constraints for contracting between a CFUG and a private firm. Furthermore, some respondents even said that there was a legal restriction for contracting. In contrast, a few believed that there was no legal restriction or policy constraint if the CFUG put the contracting scheme into the work plan. If respondents believed that there were policy/legal constraints, one can expect a high degree of uncertainty for contracting. The uncertainty of contracting is analysed in the next subsection.

7.2.2.2 Uncertainty of contracting

Uncertainty appeared to be the second most common constraint of contracting. Nineteen out of 29 respondents viewed different uncertainties of contracting. Respondents' views could be categorised into behavioural uncertainty, market uncertainty; and other uncertainty. Eleven out of 19 respondents expressed views about the behavioural uncertainty. Eight out of 11 respondents doubted the commitment of private firms and three were uncertain about the commitment of CFUG Committees. Respondents indicated that the private firms' usually short-sighted and keen on profit making nature, was specifically in uncertain business environments. In contrast, they believed CFUGs were long term and not very-keen-on-profit making organisations. The following statements illustrate behavioural uncertainty of private firms:

> *---Commitment of private firm cannot be trusted (Uda-CFUG 6)*
>
> *Private firm's commitment cannot be trusted because they are motivated by profit only. They might finish forest for their benefit (Rup-CFUG 3)*

> *Yes, the trend of private firm owner is take profit as much as s/he can and change business. Therefore, their commitment cannot be trusted (Uda-GO 2)*

> *Private firm's commitment is not trustworthy. The commitment cannot be carry on because of many uncertainties such as political and legal that impact on production and eventually to market fluctuation. Thus, there is tendency of deviation from commitment (Uda-PF 3)*

In case of CFUG, the commitment of CFUG decisions appeared to be an uncertainty. For example, the usual tenure of a CFUG Committee was found to be for two years. The short rotation of CFUG Committees appeared to be a risk in continuing decisions and commitment for contracting.

The market uncertainty was found to be another uncertainty for contracting. Seven out of 19 respondents shared this view. This implied that the timber market in Nepal was uncertain. The main reasons for market uncertainty appeared to be the substitution of timber by metal in construction. Also, some respondents expressed the view that the political uncertainty and bureaucratic complications as additional reasons for market uncertainty. The following statements illustrate market uncertainty:

> *The market price of timber is going up rapidly. This is the result of a lot of political and administrative complications. Because of the complication it is easier to buy iron steel compared to timber (Uda-PF 1)*

> *Yes, for example, some substitute materials like aluminium frame are available in the market. Likewise, I heard that timber door frame is coming from Malaysia (Rup-PF 1)*

Finally, the other uncertainties mentioned by respondents were protection of forests and the quality and measurement of timber. Six respondents mentioned these uncertainties. Local institutions of community forestry evolved from open or common resource practice. Protection of community forests from free riders, timber smugglers, and forest fire were thought to be challenging tasks. Also, there appeared to be a lack of a standard technique for measuring the quality of timber, especially in log form, in Nepal. This further could increase uncertainty for fulfilling contractual obligations. For example, a firm could be supplied lower standard logs than agreed in the contract, due to a lack of standard quality measurement techniques. The following statement illustrates how the lack of standard quality measurement techniques of logs could increase uncertainty and lead to a breaching of contracts:

> *---Sal timber can be found in four types of qualities. However, the price is defined for only one type. This is possible to pay for good quality Sal timber but getting low quality timber (Uda-PF 4)*

Thus, the behavioural uncertainty of private firms, market and other uncertainties, appeared to be constraints of contracting between a CFUG and a private firm. These uncertainties are interlinked and increased by the lack of proper policy and law for contracting. These constraints further interlinked with enforcement mechanisms of contracting. The enforcement mechanisms are analysed in the next subsection.

7.2.2.3 Lack of enforcement

Enforcement is an important factor for contracting. Without enforcement, contracting has no meaning. Respondents' views about the existing mechanism of enforcement were sought, to evaluate whether this was a constraint for entering into a contract. For this, the following question was posed to respondents:

> Tell me about the enforcement law or mechanism of contracting between a CFUG and a private firm to run a timber enterprise.

The lack of an enforcement mechanism appeared to be a constraint of contracting. Fifteen out of 29 respondents expressed the view that there were enforcement issues. For example, 13 respondents said that there was not even an enforcement law or policy. Nine out of these were the same respondents who said earlier (subsection 7.2.2.1) that there was no law and there was unclear policy for contracting. If there is no contracting law, then there is no enforcement mechanism. The following statements illustrate that there is no enforcement law, and therefore a lack of an enforcement mechanism of contracting:

> *There is no law, I think. Not in forest law at least, if in other law, I do not know (Uda-CFUG 1)*
>
> *I do not know about the enforcement law in case of forestry sector. But it appears in other sectors (Uda-GO 4)*
>
> *I do not think there are legal provision and policy to enforce a contract (Rup-PF 2)*

Since none of the CFUGs had made a formal contract with a private firm for timber business, no one was actually sure whether there was any enforcement mechanism. For example, two respondents said that there might be an enforcement law but implementation did not exist. The remaining 14 respondents out of 29 said either they did not know, or it is not relevant to them.

Thus, the lack of an enforcement mechanism appeared to be a constraint of contracting. This is not a surprise because from Chapter 6, it was found that the property rights for timber was weak and controlled by the DFO. Enforcement is none other than the safeguarding of property

rights. The frequency of transactions might be another constraint of contracting. The frequency of transactions is analysed in the next subsection.

7.2.2.4 Frequency of transactions

Frequency of transactions in terms of volume and number is another important factor of contracting. For example, there will be less likelihood of making a contract between two parties if there is a small amount and/or irregular production and vice versa. It was evident that small and/or irregular production of timber from community forests and small market transactions were constraints. For these, the bureaucratic hurdle for timber production and market sales was found to be one of the main reasons. Additionally, irregular market sales from CFUGs was another reason. The following statements illustrate that the small frequency of transactions is a constraint of contracting:

> *---we can not harvest timber each year because of the complicated bureaucratic process. Sometimes, we do not need money for community development project, therefore, we do not want to sell timber. These will make problem to establish a long-term contract (Uda-CFUG 4)*

> *It is very difficult to increase production of timber. Firstly, we have very complicated situation. Secondly, we do not have long term policy. For example, there are so many small scale furniture and sawmill industry around. Raw material is very inadequate (Rup-GO 2)*

7.2.2.5 Controlling role of DFO

The controlling role of the DFO is another important constraint of contracting. As in Chapter 6 (organisational capability) the role of the DFOs was found to be very important for contracting. The controlling role of the DFOs was found to be a constraint of contracting. Respondents believed that the controlling role of the DFOs might be motivated by corruption and/or a continuation of the traditional autocratic role. The following statements illustrate the controlling role of the DFOs as a constraint of contracting:

> *---The role of DFO is more controlling to us and corrupt. ---we are forced to obey their autocratic rule (Hukumi sasan), they do not allow us to make an agreement with private firm (Uda-CFUG 5)*

> *The existing middlemen (log-buying contractor) show temptation to CFUG members and buy DFO staff, therefore, they can not let CFUG make and agreement with sawmiller (Uda-CFUG 7)*

> *---although CFUG is an autonomous, self governed and perpetual organisation, DFO has totally captured it (Jilla ban le purai kabja gareko chha). All authorities of CFUG are kept by the DFO. Because of this, CFUG can not make a contract with private firm (Uda-PF 3)*

Thus, there appeared to be many constraints of contracting. Policy constraints and even legal restrictions were found to be the most severe constraints followed by uncertainty, lack of enforcement, frequency of transactions, and the controlling role of the DFOs. These constraints were found to be restricting the CFUGs from entering into a formal contract with a private firm for timber production and vertical integration.

In summary, contracting barriers are examined in this section. To begin, respondents' views about contracting were analysed. Most of the respondents were found to be positive and expressed views on the different benefits of contractual arrangements with private firms. Therefore, some CFUGs were found to be in contractual relationships informally in the Udayapur district. However, for a formal contract there were found to be several constraints. Many respondents believed that there was unclear policy or even legal restrictions for contracting as the most serious constraint. Later, it was clear that there were no restrictions for contracting but it has to be done through the work plan. Other constraints appeared to be uncertainty, lack of an enforcement mechanism, small transaction frequency, and the controlling role of the DFOs.

The next section will analyse constraints of cooperative arrangements of CFUGs for timber production and vertical integration with the market.

7.3 Cooperative arrangements

The aim of this section is to examine potentials and constraints for the cooperative development of CFUGs for timber production and vertical integration with the market. Like contracting, this section begins with investigating cooperative arrangements among CFUGs. Secondly, respondent's views about cooperative arrangements are analysed. Finally, constraints of cooperative arrangements are examined from the opinions of respondents using NVivo 8 computer software and the simple frequency count.

Twenty six respondents (16 from CFUGs and 10 from GOs) were asked questions related to cooperative arrangements. Further details of these respondents are given in Table 7.2. The remaining 5 CFUG respondents out of a total of 21were not asked because of time limitation. Additionally, the private firm respondents were not asked because cooperative arrangements of CFUGs, are assumed to be irrelevant to them.

Ten out of 16 CFUG respondents reported that they have initiated a preliminary form of cooperation such as joint protection of forests from timber poachers, and joint investment for rural electrification. However, for logging, processing and vertical integration, they have not

started any cooperative arrangements. Four CFUG respondents out of 10 reported that they had tried to set up a cooperative sawmill, collaborating with a few neighbouring CFUGs. All of them failed because of some constraints, which will be discussed later. Before analysing the constraints of cooperatives, respondents' views about cooperatives are given in the next subsection.

7.3.1 Respondents' views about cooperatives

Respondent's views about cooperatives' advantages and disadvantages, is important to find out the constraints for cooperative development. If respondents' believe that there are no advantages or even that there are disadvantages of cooperatives, then there will be no point in finding out the constraints. To find out respondents' views about cooperatives, the following questions were asked:

> Do you see advantages (to the CFUG) of cooperative arrangement with one or more neighbouring CFUGs? What are they and why?
>
> If there is no advantages of cooperatives to the CFUG explain why?

Many respondents immediately understood a "cooperative sawmill" when questions about cooperative arrangements were asked of them. In addition to the cooperative sawmill, respondents mentioned cooperative arrangements for joint harvesting, selling logs to private firms, value addition like furniture making, and joint retailing. These activities can be interpreted as vertical integration of timber in log form or in the finished product. Details of respondents and their views about cooperatives are summarized in Table 7.2.

Table 7.2 Summary of respondents' views about cooperatives of CFUGs.

Respondents interviewed			Overall views about cooperatives (N)		
Organisation	District	N	Advantage	No advantage	Both
CFUG	Rupandehi	6	4	2	0
	Udayapur	10	9	0	1
GO	Rupandehi	4	3	0	1
	Udayapur	6	6	0	0
	Total	*26*	*22*	*2*	*2*

Note: N – number of respondents

Table 7.2 clearly shows that cooperative arrangements are perceived to be beneficial to CFUGs. Twenty two out of 26 respondents expressed the view that cooperative arrangements would be advantageous. This positive view of cooperatives came not only from the CFUG respondents but also from the government staff. Additionally, two respondents viewed

cooperative arrangements could be both advantageous and disadvantageous. In contrast, only 2 respondents said cooperatives would be disadvantageous and it was because these CFUGs were producing a very small amount of timber, so therefore, it was not a point of interest.

The types of advantages for cooperative arrangements expressed by the respondents are summarised in Table 7.3. The most common benefit mentioned by them, was income generation and job creation because of processing and the value addition of timber. This is followed by cost reduction because of machines and economies of scale, capital raising, a better price because of bargaining power, reduction of wastage, and other.

Table 7.3 Respondents' views about the advantages of cooperatives (N = 24*).

SN	Advantages of cooperative	Number**
1	Income/job creation because of value addition	12
2	Reduce cost (machine and economies of scale)	8
3	Financial capital	5
4	Better price of logs	5
5	Reduce wastage	3
6	Other	4

Note: * Respondents who said cooperative advantageous; ** Respondent were allowed to say more than one benefit

Thus, respondents had strong and positive views of cooperative benefits. They appeared to be aware of several advantages of cooperative arrangements for timber production and vertical integration with or without processing.

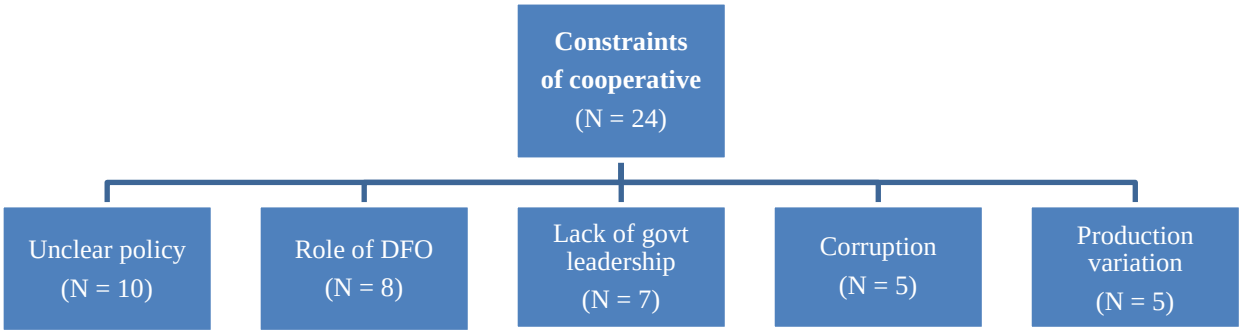
Despite these strong and positive views about the benefits, cooperatives for CFUGs had not been started. Therefore, there are likely to be some constraints for cooperative arrangements. The following subsection will analyse constraints of cooperative arrangements.

7.3.2 Constraints of cooperatives

Constraints of cooperatives are determined by asking two follow on questions from above. For this, 24 respondents who mentioned benefits of cooperative arrangements in the preceding subsection were further asked the following questions:

> You mentioned benefits of cooperative but this has not been started in CFUG, what are constraining factors?
>
> Do you see any policy constraint to establish CFUG cooperative for timber production and sale? What are they, please explain?

As in the previous section, respondents' views were analysed using NVivo 8 and the simple frequency count. The most common themes as cooperative constraints that emerged from the coding process are presented in Figure 7.2.



Note: N – frequency; Respondents were allowed to express more than one constraint

Figure 7.2 Cooperative constraint themes.

Figure 7.2 shows that unclear policy is the most common constraint of cooperative arrangements, followed by control by the DFO, the lack of government leadership, corruption, and production variation. Ten out of 24 respondents argued that there were some kinds of policy constraints for cooperative arrangements. Likewise, the DFO's role, the lack of government leadership, corruption, and variability in production were reported by 8, 7, 5 and 5 respondents respectively. These constraints are further analysed separately below.

7.3.2.1 Unclear policy

Unclear policy was found to be constraining cooperative arrangements for CFUGs in organising activities such as sawmilling, in the view of the majority of the respondents' understanding. As mentioned above, respondents immediately visualised a cooperative sawmill when cooperative related questions were asked. For example, unclear policy for setting up a cooperative sawmill was stated by 8 respondents. Three types of unclear policy appeared to be constraining cooperative arrangements. First, the "5 Km minimum distance" from a national forest boundary was unclear to CFUG respondents. This minimum distance has been reduced to "2 Km" from "5 Km". The Department of Cottage and Small Industries (DoSCI) states that for the registration of a private sawmill it has to be at least "2 Km distance" from the boundary of a national forest in the Terai region (Department of Cottage and Small Industry, 2008). The CFUG respondents seemed to be confused with the Forestry Law (Forest Act 1993 and Forest Regulations 1995) and the Administrative procedures of the

Department of Cottage and Small Industry (2008). The following statements illustrate their confusion about policy for setting up a cooperative sawmill:

> *Forestry law is not clear enough. For example, Forest law states that a sawmill has be at least "5 Km away" from a national forest. In my view, this is for private sawmill. This is not clear whether it applies to CFUGs as well (Rup-CFUG 3)*
>
> *We have not started a cooperative and a sawmill because Forest Regulation 1995 states the minimum "5 Km distance" from a national forest (Uda-CFUG 6)*
>
> *We have not started such cooperative because---DFO does not allow us to run such cooperative as Forestry Rule restricted to set up a sawmill within "5 Km distance" from a national forest (Uda-CFUG 9)*

The "2 Km distance" was not a problem because this rule was found to apply in the case of private sawmills, not in the case of CFUGs. However, the CFUG needs to obtain a "no objection" letter from the DFO to register a cooperative sawmill at the District Cottage and Small Industry Office (DCSIO). According to the government staff, the intention to establish a cooperative sawmill has to be included in the work plan. Three out of 11 respondents said that a cooperative sawmill could be established by putting it in the work plan. The DFO in Udayapur did not give a "no objection" letter to an interested CFUG that wanted to set up a cooperative sawmill, on the grounds that it was not included in the work plan. The failure to obtain a "no objection" letter was incorrectly interpreted to be because of the "5 Km minimum distance" rule.

Two respondents expressed their doubt about policy on whether a CFUG can be a member, similar to an individual, of a cooperative under the Cooperative Law 1992. According to the Law, at least 25 individual members or 5 organisations could form a cooperative ("Cooperative Act of Nepal," 1992). The following statement illustrates respondents' doubtfulness about membership:

> *The current Cooperative Act (1992) has stated that a cooperative can be formed by interested individuals registering at the district cooperative office. This Law does not specify whether CFUG as an organisation can be a member and form a cooperative (Uda-CFUG 9)*

It is unclear from the policy standpoint whether the cooperative, after sawmilling and/or value addition, has to consume the sawn wood and/or finished product such as furniture, among cooperative members, or whether it can sell its product to the market. As the cooperative is a different and independent organisation based on the Cooperative Law 1992, it would potentially be allowed to vertically integrate with the market.

Thus, in many respondents' understanding, the unclear policy was thought to be constraining the cooperative arrangements of CFUGs, especially a cooperative sawmill. Later, these policy issues were clarified by some respondents and by a review of Legal documents that cooperative arrangements could be made by putting a cooperative scheme in the work plan and registering it with the DSCIO. The role of the DFO is analysed in the next section.

7.3.2.2 Role of the DFO

The role of the DFO appeared to be the second most common constraint of cooperatives. As mentioned above, to set up a cooperative sawmill and/or other scheme, the DFO's role is important, for approving a cooperative sawmill or other scheme in the work plan, and for providing a "no objection" letter that is necessary for the registration of a cooperative. The following statements illustrate the role of the DFO as a constraint for setting up a cooperative sawmill:

> *We do not know whether the DFO allows us to form a cooperative (Rup-CFUG 5)*
>
> *The DFO did not give us approval to run a sawmill (Uda-CFUG 4)*
>
> *Yes, we tried to set up a sawmill in collaboration of 4-5 CFUGs. The DFO did not recommend us for this. Therefore, we could not set up a sawmill (Uda-CFUG 7)*
>
> *For the registration of a sawmill, there are some requirements such as no objection letter from local village development committee or Municipality and a no objection letter or a recommendation letter from the DFO. To get a no objection letter from the DFO is difficult (A Respondent)*

The above views were mainly expressed by the CFUG respondents. Government staff also agreed that the DFOs did not support CFUGs for setting up a cooperative sawmill. However, their reasons for not supporting a cooperative were the lack of budget and other skills in both the DFOs and the CFUGs. Despite the claims of the DFO staff, the roles of the DFOs appeared to be a constraint to establishing cooperative arrangements. The lack of a budget for the DFOs to support cooperative activity is partly a lack of government leadership, which is analysed in the next subsection.

7.3.2.3 Lack of government leadership

The lack of government leadership in promoting cooperative arrangements of CFUGs for timber production and enterprise development, appeared to be another important constraint. The government leadership includes a lack of vision/concept, and a lack of budget and human resources to support cooperatives of CFUGs. Generally, CFUGs are dependent on the strong support of the DFOs. Without the strong support of the DFOs and/or DSCIO, the

development of cooperatives for CFUGs will not take place. The following statements illustrate the lack of government leadership for the cooperative arrangement of CFUGs:

> *The first constraint of cooperative arrangement is lack of vision and concept of cooperative (Rup-CFUG 9)*
>
> *The concept of cooperative has not arrived yet. Cooperative management has not been put in our working plan (Uda-CFUG 1)*
>
> *There is no constraining factor of cooperative arrangement. However, --- vision/concept for this is not fully developed. For example, CFUG could have developed a joint scheme of sawmill or NTFP processing plan. Additionally, cooperative is not happening due to lack of leadership. The DFO is the leading institution to CFUG but we do not have any system of getting incentive to lead for this (Rup-GO 4)*
>
> *There is a good possibility of CFUG cooperative in the future. The challenges are skill providing organisation and capital. They can raise capital applying shareholding approach. However, for the first, government has to give priority to cooperative development (A GO Respondent)*

Thus, lack of government leadership in cooperative development appears to be a constraining factor for not starting cooperatives of CFUGs. In addition to the lack of government leadership, variability in production is found to be another constraint. The variability in production is analysed in the next subsection.

7.3.2.4 Variability in production

Five respondents said that the variability in production because of forest size and quality, and the number of households in the group, might be constraining cooperative arrangements. As mentioned in the literature review on common property resources and collective actions, internal disputes are a phenomenon of local institutions. Differences mentioned above may contribute to increase inter- and intra-group disputes which may constrain cooperative development. The following statements show that the variability in timber production could cause disputes and are therefore considered to be constraints of cooperative arrangement:

> *We do not think it is possible to run a cooperative collaborating 8 or 10 CFUGs. This is because we can have dispute very easily. We are having difficulty to implement collective decision even in our CFUG (Uda-CFUG 10)*
>
> *There is possibility of conflict of interests in CFUGs for making a cooperative because they do not have similar size of forest and production (Rup-GO 2)*

Thus, variability in production appeared to be constraining cooperative arrangements indirectly if not directly. In addition to the variability in production, corruption appeared to be another constraint of cooperative arrangements. Corruption as a cooperative constraint is analysed in the next subsection.

7.3.2.5 Corruption

Corruption appeared to be another constraint of cooperative arrangements. Corruption is believed to be constraining cooperative development indirectly. For example, it is clear from Chapter 6 (organisational capacity) that corruption was an issue in the timber business from community forests. The cooperative development of CFUGs would mean vertical integration with the market. This would provide a direct market access for the CFUGs, which would prevent the existing bribing system of CFUG Committees as well as DFO staff. The following statements illustrate how corruption is constraining cooperative arrangements:

> *As I mentioned earlier the prevalence of personal commission (bribe) from the timber sale is main constraining factor for not initiating a cooperative arrangement (Uda-CFUG 8)*
>
> *Some powerful Committee members of CFUGs might be getting personal benefit from the existing system. Therefore, these people are not willing to initiate cooperative (Uda-GO 3)*
>
> *CFUGs have tried to set up cooperative but could not fight against the corrupt bureaucracy, which has a very complicated and strong network of corruption. If they allow CFUGs to open a sawmill and form a cooperative local people will have market access. Once they have market access they do not pay bribe to the bureaucracy (A Respondent)*

Thus, corruption appears to be a constraining factor of cooperative arrangement.

In summary, this section analysed respondents' views of the advantages and disadvantages, and constraints of cooperative arrangements for organising logging, sawmilling, and vertical integration with the market. Almost all respondents from CFUGs and government staff believed that the cooperative arrangement would be beneficial to CFUGs in many respects. However, there appeared to be some constraints. The most common constraint appears to be unclear cooperative policy for CFUGs. This is followed by the DFO's role, the lack of government leadership, variability in production, and corruption. However, the first two constraints could be removed by the CFUGs, by putting the cooperative scheme in their work plan. So, there seemed to be only minor constraints for cooperative arrangements of CFUGs for vertical integration. If economies of scale are an issue for sawmilling or processing and for selling forest products, then even cooperative arrangements just for selling logs, could increase CFUG bargaining power against private firms.

7.4 Summary of Chapter

Institutional barriers for contracting and cooperative arrangements in arranging logging, processing, and selling, and vertical integration with the market, for community forests are

analysed in this chapter. The majority of respondents were of the view that contracting between CFUGs and private firms would be beneficial. In the Udayapur district, some CFUGs appeared to be in an informal form of contracting for logging and selling logs. However, to make a formal contract between them, some respondents believed there to be policy/legal constraints. This is followed by other constraints of high uncertainty, lack of enforcement, small frequency of transactions, and the controlling role of the DFO. A few respondents argued that there are no legal constraints if the contracting scheme is put in the work plan. Therefore, constraints appeared to be crucial for long term formal contracting.

For the cooperative arrangements of CFUGs, almost all respondents believed that cooperatives would be beneficial to CFUGs. They have initiated some preliminary forms of cooperation. However, for a formal cooperative arrangement for logging, selling logs, and sawmilling and value addition there seemed to be some minor constraints. These constraints appear to be unclear government policy, the DFO's role, the lack of government leadership, corruption, and variability in production. Some respondents argued that policy was not an issue but the economies of scale for sawmilling could be an issue. The policy issue could be overcome and the DFOs support could be gained if a cooperative scheme is put in the work plan.

Therefore, compared to contracting, constraints of cooperative arrangements of CFUGs appeared to be minor. Cooperative arrangements of CFUGS appeared to have the potential to benefit CFUGs, at least to increase their bargaining power against log buyers, if not for sawmilling and value addition. Discussion and a conclusion are given in Chapter 8 and Chapter 9 respectively.

Chapter 8
Discussion

8.1 Introduction

Chapters 5, 6, and 7 reported the findings of this study. These chapters were organised around the three research objectives: timber production costs; organisational capacity of a CFUG in arranging logging and market sales; and institutional barriers for contracting and cooperative arrangements for vertical integration with the market. The purpose of this chapter is to discuss conclusions from the findings of this study. This chapter is organised in two sections. Section 8.2 summarises the findings and provides discussion for each of the research objectives and Section 8.3 provides a synthesis of all the main findings.

8.2 Summary of findings and discussions

This study has analysed timber production and institutional barriers of community forestry in the Terai and Inner-Terai regions of Nepal. The goal of this analysis is to examine the economic performance of CFUGs to explore the possibility of increasing financial benefits to community forest users (the managers). The key research issue of this study was why little or no timber is produced for the market from community forests despite having a relatively large number of CFUGs, growing stock improvement, and competitive advantages of high value Sal forest, fertile land, connection to transportation networks, and being close to regional markets. This study has been conducted in two districts – Rupandehi and Udayapur of the Terai and Inner-Terai regions of Nepal respectively. CFUG members are the main participants in this study. Additionally, government agencies (the District Forest Office and the District Cottage and Small Industry Office), private firms (log buyers and sawmillers), and non-governmental organisations (NGO) have been consulted.

The literature review covered a wide range of possible ways of structuring the study, including common property resource management and collective action, new institutional and transaction cost economics, production efficiency, characteristics of a successful firm, vertical integration, contracting, and cooperative arrangements. Based on the literature review, a CFUG's business approach for timber production and market sales was characterised as a social firm. The business approach of a CFUG looks at three issues: economies of scale in logging, internal management related to organisational capacity, and external coordination

related to contracting and cooperative arrangements. These issues are related to the three research objectives of this study.

8.2.1 Research Objective 1

To investigate whether there are economies of scale in logging in community forests so that the logging operation is profitable to pursue

There are two key findings under this research objective. First, an analysis of the average contract logging cost in 62 community forests in Udayapur district showed that there was no scale effect on logging cost. These findings are consistent with the report of Yadav (2003). He reported the existence of a fixed rate for timber harvesting and transportation in the Terai and Inner-Terai regions. Additionally, there appeared to be no scale effects in the revenue received by CFUGs or net cost to buyers. The main reason for this is the low and uniform sales price of Sal logs. In turn, this is because of seemingly less competitive auction sales under the influence of log-buying contractors who have made investments in community forests prior to logging.

Second, the determinants of the annual production of Sal timber were found to be the growing stock of Sal (GSsal) and forest area (FA), although these variables explained only 20 percent of the variability in harvest levels. Using these results, the annual amount of Sal timber could be increased by about 0.2 cubic metres by adding a cubic metre of growing stock. Similarly, the annual harvest of Sal timber could be increased by 0.074 cubic metres by adding a hectare of forest area under community forest. These findings are similar to other studies that have found that the amount of timber production is a function of growing stock and forest area, with the results of Siry & Newman (2001) and Misra & Kant (2004).

These findings are important for the timber production and market sales from community forests in three ways. First, logging cost effectively is not a problem even from a small size forest and from any location. This means the problem of little or no production of timber for market sales from community forests lies somewhere else. Thus the discussion is focussed on these other aspects. One of the main aspects creating problems is attributed to the DFO's control in harvesting of timber. For example, in the Rupandehi district the DFO allows only the harvest of dead and fallen trees. This pro-conservation practice of timber extraction limits green timber production, and as well as hinders natural regeneration and productivity of community forests as many of these forests are stocked with over-mature Sal trees.

Second, in community forests of Udayapur district, where CFUGs are allowed to harvest green trees, the volume of timber production is small (on average 50 m^3 per CFUG) . This

implies that CFUG members have limited scope to gain economic benefits from timber enterprise development or commercial-scale production. Based on the small scale of timber production the vertical integration by a single CFUG – sawmilling and marketing of finished product to the market – is not feasible because of economies of scale problems.

Third, economic rational cannot explain the uniform timber price, and thus timber revenue to CFUG, as well as the net cost to log buyers in community forests of Udayapur district. These findings indicate that the auction sale process is either an artificial free market, or is highly influenced by the investment of log buying contractors in CFUGs prior to logging. This is not surprising because auction sales work well in competitive and free market conditions where an individual seller and/or buyer cannot influence the market price. These findings indicate that there is no point in arranging auction sales to achieve a competitive market price, especially where CFUGs have borrowed money from contractors or log buyers involved in the logging in the expectation of buying logs.

Thus, size of forest for logging cost effectively is not a problem in community forests. However, the DFO's control over logging appears to be a problem for timber production in community forests.

8.2.2 Research Objective 2

To examine the organisational capacity or internal management of a CFUG for timber production, processing and market sales

The results showed weak organisational capacity of a CFUG for timber production, processing and market sales. The weak organisational capacity was manifested in five themes: weak property rights for timber, strong control of the DFO, corruption, government policy constraints and lack of internal resources. These results are consistent with the findings of Baland & Platteau (2003), Behera & Engel (2006), Nair (2005), North (1990), Oli (2003), Staz & Tumbahangphe (2004), Wiiliamson (1998), but different from the findings of Antinori & Bray (2005) and Bray et al. (2006). These organisational capacity themes are discussed below.

The weak property rights for timber were attributed to weak rights over logging, processing, selling timber and timber revenue use. Baland & Platteau (2003) argue that local users have no incentive to guard resources against external intruders if government does not support them by granting clear property rights with legal back up to enforce property rights. The weak property rights mean that a CFUG cannot make decisions about market sales, and thus cannot increase revenue by realising better prices in the market. Second, a CFUG cannot raise

financial capital by borrowing money from a financial institution like bank or by attracting private investment. Third, a CFUG cannot make a contract with a private firm to integrate vertically. Investment is essential for intensive management such as thinning and planting, building roads, or setting up a sawmill and processing yard. Thus, weak property rights for timber means a CFUG cannot bring resources in the production system, integrate vertically, and run a business, resulting in a weak firm.

The strong control of the DFO was another important theme of the weak organisational capacity of a CFUG. The strong control of the DFO shows that the government's conservation priority in community forest management prevails. This means forest users' welfare and market priorities are not taken into consideration or are highly undermined. This implies that forest users cannot make economic decisions about running a timber business from community forests.

The strong control of the DFO raises several questions related to fundamental principles of community forestry, including the role of the collective common, sustainability and existing government policies. Even the first principle of long term, enduring institutions of commons enunciated by Ostrom (1990) – "clearly defined boundaries" (Ostrom, 1990) or "Rules are devised and managed by resource users" (Dolsak & Ostrom, 2003) – is not respected, let alone the other seven principles. The ability of a CFUG to operate as an autonomous organisation based on the Forest Act 1993 and Master Plan of Forestry Sector 1989 is highly questionable. Second, the government policy of devolution of power to local users is still not in practice in the field. There are two potential reasons for this. First, the government does not want to hand over power to the local users in the Terai and Inner-Terai regions because of the high economic value of Sal forests. Second, power devolution is not likely if rules are not only overlapping, but also crafted (through the work plan of CFUG), regulated and enforced by the DFO instead of forest users. In other words, power devolution to the local community forest users from government is very unlikely in the present situation, where the DFO has unclear boundaries as well as too much power.

The rampant corruption is an unfavourable environment for any type of business. Corruption increases transaction cost of business as well as leaks a considerable portion of revenue from market chain. Robbins (2000) argues that corruption is an institutionalised system and put risks on sustainability. He further argues that in forest administration of India *de jure* becomes *de facto* rights of Forestry Officials for corruption. In prevailing corruption nobody wants to invest in business and work hard because of uncertainty of return as robbing by few powerful

people is common. This is why despite of decades of establishment CFUGs are in lack of financial capital even for logging.

Government policy constraint for timber production and market sales from community forests is the fourth theme of weak organisational capacity of a CFUG. The Forest Sector Policy (FSP) 2000 appeared inconsistent with the Forest Act 1993 and Master Plan for Forest Sector (MPFS) 1989. The Act states that the use and management of community forests by the CFUG independently. I argue that the timber harvest, processing and selling to the market are part of the management of community forests. And the Plan aims at "freeing the internal trade and transport of timber and fuel wood from all restriction". However, the FSP discourages market sales of timber obtained from community forests. The FSP appeared a strong basis for the DFO's control over CFUGs for timber production and market sales, and weakening property rights for timber. The FSP may help in the case of degraded forests discouraging potential market driven unsustainable felling. However, I argue that the FSP is inconsistent with the Forest Act 1993 and the MPFS. CFUGs in Udayapur district, which were the main producers of timber for market sales in this study, harvested only 66% of the AAC in year 2006/07. Thus, I argue that putting extra administrative checking on the agreed work plan not only discourages extraction and selling of timber but also inappropriate and over crossing the CFUG boundary by the DFO.

Likewise, government policy appears unfavourable or incomplete for development of CFUG enterprises. There appears to be a long registration process for timber enterprises, and a policy of no private investment in CFUG timber enterprises or community forestry in general. In this unfavourable policy environment, resource exploitation and enterprise development do not take place. One of the potential reasons for this is that the DFO (and other government agencies) does not want to provide a business status to CFUGs and either undermines the CFUG in this process or deliberately blocks it. The Centre for International Forestry Research (CIFOR) (2008) argues that one of the problems of community based forest product enterprise development in Nepal is that a CFUG has no status as a business firm. Based on this argument and findings about policy constraints, the initial assumption of CFUG as a social firm is questionable.

Finally, the lack of internal resources in CFUGs is found to be another theme relating to weak organisational capacity of a CFUG. The weak internal resources are in terms of low forest endowment, lack of financial capital, and lack of skill in the CFUG Committees. Results show only community forests that have 0.5 hectare or more of forest endowment per household are able to sell timber to the market. This indicates that timber production for

market can only be expected from CFUGs with a relatively large forest endowment. This result is consistent with the findings of Antinori 2000 and Torres-Rojo, Guevera & Bray (2005) who reported that only CFEs with a relatively high forest endowment in Mexico were active in timber business. In addition to the forest endowment, the lack of financial capital for logging (and other activity) and lack of skills in the CFUG Committees indicate the weak organisational capacity. This is likely linked to the weak property rights and strong control by the DFO as discussed above. The lack of financial capital and lack of skills in the Committees does not limit timber production from community forests that have small forest endowment. But, these shortcomings appear to be limiting timber production in community forests that have a relatively high forest endowment.

All five of these organisational themes are complementary and responsible for limiting timber production and market transactions from community forests. Weak property rights for timber are manifested in the strong control of the DFO over CFUGs for timber production and market sales. Both of these themes are attributed to the interpretation of government policy as restricted for timber production and market sales from community forests. The weak property rights and DFO's strong control appear to be contributing to corruption, which ultimately reduces the internal resources of CFUGs, particularly financial capital. Consistent with the argument of Nair (2005), all these themes are interrelated and responsible for corruption and high transaction costs of forest product business, resulting in little or no production and market transactions. As well, from the transaction cost economics point of view put forward by Williamson (1985, 1998), the sincere implementation of community forestry through the powerful DFO and less educated and informed CFUGs is unlikely because of human nature and opportunism. The relationship bewteen the CFUG and the DFO can be considered as a contractual relationship.

Thus, the organisational capacity of a CFUG for timber production and market sales is weak because of five themes – weak property rights for timber, strong control by the DFO, corruption, government policy constraints and lack of internal resources. These themes are complementary and responsible for limiting timber production and market sales from community forests of the Terai and Inner-Terai regions of Nepal.

8.2.3 Research Objective 3

To determine institutional barriers for contracting arrangements for vertical integration with the market

The results showed that there were several institutional barriers for contracting and cooperative arrangements that prevented vertical integration with the market. The constraints to contracting appeared to be crucial compared to constraints to cooperative arrangements. The most important constraint to contracting was found to be related to policy constraints and/or legal restrictions. The current practice of requiring auction sales for timber from CFUGs is seen as evidence of a legal restriction to contracting. The other important constraints found were uncertainty, lack of enforcement mechanisms, small amounts of production and market transactions, and the controlling role of the DFO. These results are consistent with the findings of Behera & Engel (2006) and North (1990).

These results also indicate that long term contracting is almost impossible between a CFUG and a private firm, and this prevents vertical integration. However, short term contracting has potential, provided the policy/legal status for formal contracting is clarified. One of the main causes of the policy/legal ambiguity about formal contracting, as well as other contracting constraints, is believed to be the fact that a CFUG has no business status, as discussed above. Once the business status of a CFUG is clarified in policy it will be easier for CFUGs and private firms to make decisions about whether to forge a formal contract between them.

For cooperative arrangements, which is less crucial compared to contracting, the most common constraint appeared to be unclear government policy about cooperative arrangements. Other constraints include the unsupportive role of the DFO, lack of government leadership, variability in production, and corruption. Respondents generally imagined a cooperative sawmill when questions about cooperative arrangements asked. These findings were similar to Brennman (2004), CIFOR (2008), Jentoft (1989), Timsina (2007). A cooperative is also a form of contracting between smallholders. Therefore, a cooperative arrangement is also affected by the existing rules related to contacting and enforcement of contracts. Scholars agree that cooperative arrangements are helpful, particularly for small producers, to reduce transaction cost by achieving economies of scale in transportation, processing and marketing. Additionally, where CFUG cooperatives have formed in Nepal, they have obtained a business firm status by the government (CIFOR, 2008).

Fewer constraints and having a business status means CFUGs could arrange cooperatives for timber production and vertical integration with the market. Cooperative arrangements are not currently needed for logging because the production technology is rudimentary and CFUGs are harvesting timber cost effectively. However, I argue that a cooperative of CFUGs can benefit them to achieve economies of scale for smallscale sawmilling and marketing. This could apply in other general activities of community forestry as well as, for example,

employing a Forestry Ranger by a cooperative of CFUGs. The cooperative arrangements of CFUGs will benefit them in many ways. First, a cooperative can set up its own sawmill instead of having to sell logs. Second, a cooperative can buy logs from other CFUGs and either mill them or sell them to private firms. Even if the cooperative sells in log form it will have advantages of scale and bargaining power against private firms. Third, as the cooperative has a business status, it can forge a formal contract with private firms for vertical integration. Fourth, a cooperative can afford to hire a Forest Ranger who can assist them in timber harvesting and sawmilling, as well as other forest management activities such as thinning, conducting a forest inventory and revising/preparing the work plan. Employing a Forest Ranger by a single CFUG is economically unfeasible. The cooperative can also sell the service of the Forest Ranger to other CFUGs.

Thus, the results show that institutional barriers exist for contracting and cooperative arrangements for vertical integration with the market. Compared to contracting, constraints to cooperative arrangements appear minor. As CFUGs are smallscale producers, cooperative arrangements are very likely to benefit them to increase timber production and returns to CFUG members.

8.3 Summary

This study aimed to find the answer to the big research question of why little or no timber is produced for the market from community forests of the Terai and Inner-Terai regions of Nepal. For this, three specific research objectives are proposed at the outset. These objectives are to examine economies of scale for logging, organisational capacity in arranging logging and market sales, and institutional barriers for contracting and cooperative arrangements for vertical integration with the market.

The economies of scale related results show that there is no scale issue in logging. Sal timber can be harvested profitably from all sizes and geographical locations of community forests. However, the other results indicate two things. First, the DFO's control over CFUGs in harvesting and market sales, particularly in the Rupandehi district, is largely responsible for the fact that little or no timber is produced for market sale. Second, the small average amount of annual production of Sal (and thus the market sales) in community forests of Udayapur district is because of small growing stock of Sal and the small forest area.

The results related to organisational capacity show that a CFUG is a weak firm for timber production and market sales. The weak organisational capacity themes are revealed in the weak property rights, strong control of the DFO, corruption, government policy constraints

and lack of internal resources. These themes are complementary and responsible for limiting timber production from community forests. The first two themes are the most important compared to the rest.

The institutional barriers related to vertical integration with the market results show that there are several constraints to contracting and formation of cooperatives. These constraints appear to further lower the production of timber from community forests. The contracting constraints are more crucial than the cooperative constraints. I argue strongly that cooperative arrangements are most important because of the small production of CFUGs, their weak organisational capacity, and the potential benefits of cooperative arrangements, including the recognition of a business status by the government.

The cooperative arrangements are not needed for logging but can benefit CFUGs in realising economies of scale for sawmilling, transportation and retailing of sawn timber, raising human and financial capital, increasing bargaining power against private firms, providing legal authority for making a formal contract with the private firms for vertical integration, and development of small scale timber enterprises in community forests.

Chapter 9
Conclusion

The main purpose of this chapter is to draw conclusions from the findings highlighted in Chapter 8. In addition, this chapter will outline some implications of the conclusions and put forward some thoughts for future research.

This study aims to analyse timber production and institutional barriers of community forestry in the Terai and the Inner-Terai regions of Nepal in the context of realising economic benefits from high value Sal forests for the community forest users (managers). This study examined three specific research objectives: (A) to investigate whether there are economies of scale in logging in community forests; (B) to examine the organisational capacity or internal management of a CFUG for timber production, processing, and market sales; and (C) to determine whether there are institutional barriers for contracting and cooperative arrangements for vertical integration with the market. This study applied a business approach in terms of characterising a CFUG as a social firm looking at logging efficiency, internal management for production, and external factors for vertical integration with the market.

Three key conclusions are drawn from the three research objectives. First, there is no issue of scale in logging in community forests. The main reasons for this are the prevalence of standard piece rates for logging and the labour-intensive nature of logging. The determinants of annual production of Sal timber are what the DFO approves, the growing stock of Sal and the forest area. These results imply that the reason for low or no production of timber from community forests is not because of inefficiency or scale in logging but rather external factors such as restrictions on harvest in the work plan due to the DFO and the relatively small growing stock of Sal and forest area in each CFUG.

The second conclusion is that the organisational capacity of CFUGs in arranging logging and market sales is weak. The themes of the weak organisational capacity are: weak property rights over timber; control of harvest by the DFO; corruption; government policy constraints; and lack of internal resources. These themes are complementary and contribute further to a decrease in timber production from those community forests that have relatively well-stocked Sal forests and adequate forest size in terms of area. Among these themes, the weak property rights for timber and control of the DFO over harvest are the most crucial. The small scale of production and weak organisation indicate that vertical integration by single CFUGs is not feasible, leaving only options for contracting and cooperative arrangements.

The third conclusion is that there are several institutional barriers to contracting between a CFUG and private firms, and to cooperative arrangements among CFUGs. This inhibits vertical integration with the market. These institutional barriers are further contributing to limit production of timber from community forests. The institutional barriers for the cooperative arrangements appear less crucial. Moreover, cooperative arrangements of CFUG appear to be beneficial to CFUGs in many ways for timber production and vertical integration with the market.

Overall, this study examined the big research question of why no or very little timber is being produced from community forests for market sales in the Terai and the Inner-Terai regions of Nepal despite of having many comparative advantages. The results of this study show that the lack of production of timber not due to the issue of economies of scale in logging, but rather the DFO's control of activities, the small growing stock of Sal, small forest areas, weak organisational capacity of CFUGs for timber production and market sales, and institutional barriers for vertical integration with the market.

9.1 Implications

The findings of this study have far-reaching implications for CFUGs, government agencies, private firms, NGOs, and policy makers. Further, implications could even be drawn for other common property resource managers in Nepal and elsewhere. These implications are outlined below.

Community Forest User Groups

CFUGs can increase amount of annual production of timber by increasing the growing stock of Sal and by increasing forest area. CFUGs can apply intensive forest management such as thinning, plantations or improved regeneration in community forests with low timber stocks. However, the associated costs of intensive management have to be considered. Additionally, CFUGs can make a request to the DFO for the expansion of a community forest if public forests available in their vicinity. The minimum forest endowment is recommended to be 0.5 ha per household.

For the organisational capacity development, CFUGs need to work under the direction of an organisation that is independent of government agencies, particularly the DFO. For this, the CFUGs should be able to prepare their work plan on their own, either employing their own Forest Ranger or hiring these services from the market, such as a forestry-based NGO. Second, CFUGs should clearly define property rights for timber and help to a business status

for timber production and market sales. CFUGs can work together and with private firms to get legal clarification about the property rights for timber and the boundary of the DFO. CFUGs should work like the manager of community forest not as a forest user that depends on the mercy of the DFO. Further, CFUGs should craft and enforce local rules that can bring more investment, increase sustainable production and employment in CFUGs.

Finally, for vertical integration with the market, CFUGs should move to create cooperatives by clarifying policy issues and/or legal restriction for contracting and cooperative arrangements. CFUGs can gain a business status from the government as well as economies of scale for sawmilling and retailing. This will allow CFUGs to accumulate financial and human capital, increase bargaining power, and increase the potential for the development of small-scale timber enterprises. CFUGs can establish a cooperative by including this in their work plan and registering formally at the DCSIO. CFUGs that cannot form cooperatives should make short term formal contracts with private firms to create vertical integration.

Government agency – DFO and DSCIO

The DFO is the most important external organisation for CFUGs for timber production and market sales. The findings of this study have several management implications for the DFO. First, the DFO can help CFUGs to increase annual production of Sal timber by either supporting them in intensive forest management and/or handing over more national forests to them particularly to those CFUGs that have lower than a 0.5 ha/HH forest endowment. Second, the DFO can support CFUGs to improve organisational capacity by working with them as a partner – building trust and releasing more property rights for timber. The DFO should allow CFUGs to work independently to craft and enforce local rules so that their capacity can be developed and they are able to adapt to changing market conditions. Timber production and market sales are the business of the CFUG – let them do their business. Third, the DFO can encourage and support CFUGs for cooperative formation and contracting with the private firms for vertical integration with the market.

The DSCIO can help CFUGs in two ways to increase production of timber and market sales. First, the DSCIO should clarify the policy about the cooperative formation process for CFUGs, including potential benefits and limitations. Second, the DSCIO can help in the registration and management of cooperatives for sawmilling, processing, market sales, and other activities in coordination with the DFO.

Private Firms (Log buyers and Saw millers)

Private firms can also help CFUGs in timber production and vertical integration with the market. They can help by forging long term relationships for mutual benefits. They should encourage CFUGs to enter into formal and transparent contracts in order to avoid potential risk of internal disputes and corruption. Secondly, private firms can help CFUGs in sawmilling and retailing sawn timber, particularly in cities.

Non Governmental Organisation (NGOs)

The NGOs can continue to help CFUGs in the revision and preparation of work plans. Additionally, they can help CFUGs to carry on the business of timber production as well as timber enterprise development.

Policy makers

Policy makers can help CFUGs in timber production and market sales in a number of ways. First and the foremost, policy makers should revise the rules and policies related to community forestry and national forestry. The overlapping of rules, the amount of power given to the DFO, and the multiple roles of the DFO (forestry technical service provider, policing and judicial) appeared to be problematic for the organisational capacity development of CFUGs. Therefore, the policy makers can devise policies that limit the power of the DFO, in case of community forestry. For example, the local government or the District Development Council could approve the work plan instead of the DFO. The DFO should only support forestry management activities for the CFUG. In case of conflict between CFUG and the Council or the DFO the public Judicial Court can hear the case like in other cases.

Second, policy makers should devise a policy that encourages CFUGs to increase timber production and enterprise development. For example, they can bring in a policy that ensures strong property rights for timber and reduces corruption, shows long term commitment to retain forestry policy and provides financial assistance for forest management, logging and enterprise development. More than 14,000 CFUGs (35% of the national population) involved in the forest management in the country. There is a huge potential to mobilise CFUGs as strong local institutions for sustainable management of forest resources and economic benefits.

Third, policy makers should bring in policies that encourage cooperative arrangements and formal contracting with private firms in order to increase mutual gains in the timber business by vertical integration with the market. The main way to do this is to remove existing

institutional barriers of contracting and cooperative arrangements. For example, as small producer CFUGs should be supported by policy to form and develop timber business cooperatives in order to gain economies of scale for sawmilling, transportation and retailing. A second option, especially to those CFUGs cooperative arrangement is unfeasible and/or unwilling, policy should support for a formal contracting between CFUG and market agent for vertical integration.

Other common property resource institutions

This study is focussed on timber production for market sales, looking at the issue from a business approach and considering the CFUG as a social firm. Some implications from the findings of this study can be drawn for other common property resource management groups like watershed catchment groups in Nepal, and fishery or pasture groups elsewhere. For example, these groups' organisational capacity for sustainable production of common resources and business performance could be developed by ensuring strong property rights over resources, reducing government control, and supporting vertical integration with the market.

Contribution to the common property, small scale forestry literature

The findings of this study contribute in the literature on small scale forestry. There is research gap in small scale common property forestry in terms of timber production efficiency. This study extends further knowledge in small scale community forestry applying the theory of a social firm and transaction cost economics.

9.2 Limitation

A study without any limitation is almost impossible. This study has the following three limitations. First, survey data were collected from only two districts – one district from each Terai and Inner-Terai region of Nepal. Further, the production analysis of timber was carried out using data only from Udayapur district. Results drawn from this study have limited generalising ability. Second, despite efforts made to collect data for three years data of only year 2006/07 were found in most of the CFUGs. Therefore, cross-sectional data of the year 2006/07 only were used for this study. The cross sectional data gives only a snap shot picture of industry. This further limits the generalising ability of the results. Third, despite of high transaction cost evident from the beginning of this study all transaction costs related activities were not captured and measured in this study.

9.3 Thoughts for future research

To avoid limitations of this study three thoughts are proposed for future research. First, future researchers should collect data covering more districts and community forests. This will increase the ability to generalise results. Second, future research should collect panel data that consists of both cross-sectional and time series data. Panel data results will provide a better picture as well as show the dynamics of timber production in community forests. Finally, although it is difficult and time consuming all costs related to transaction of timber business should be captured and measured.

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Appendix A: Details of sample CFUGs from Udayapur district

SN	HH	FA	GS	*GSsal*	AAC	AH	AHsal	ALC	MS of Sal	IS of Sal	AMS Price	AIS Price
	no.	ha	m3/ha	m3/ha	m3	m3	m3	Rs/m3	m3	m3	Rs/m3	Rs/m3
1	117	280	127	18	44	24	7.4	1760	7.4	0	9328	0
2	72	111	107	24	56	13	12.8	1760	12.8	0	9328	0
3	70	237	193	92	79	42	39.0	1760	39.0	0	9152	0
4	821	404	100	31	112	44	26.9	1408	0	26.9	0	1760
5	73	123	123	107	43	27	26.5	1408	0	26.5	0	1760
6	80	155	164	47	69	14	14.0	1584	14.0	0	9539	0
7	143	188	290	242	81	38	37.7	1584	28.2	9.5	9680	1760
8	189	202	218	60	72	62	46.7	1760	23.1	23.6	9680	1760
9	73	33	242	242	15	15	15.2	1760	15.2	0	8870	0
10	111	226	162	158	59	36	25.9	1584	25.9	0	9856	0
11	450	601	261	163	169	105	75.9	#	0	75.9	0	1760
12	460	523	147	75	168	126	82.6	#	0	82.6	0	2464
13	280	338	136	68	57	25	12.8	#	0	12.8	0	1760
14	384	334	97	55	71	62	40.4	1232	28.3	12.1	9715	1760
15	142	204	203	139	61	28	28.4	1408	0	28.4	0	880
16	254	240	65	47	35	35	25.2	1584	10.1	15.1	11440	2640
17	274	433	107	99	31	25	24.6	1408	0	24.6	0	1478
18	215	340	92	62	102	88	59.7	1408	30.5	29.1	11510	2253
19	109	184	170	43	34	9	8.6	1654	7.0	1.6	9680	880
20	119	307	241	136	103	63	40.3	1584	37.4	2.8	9680	880
21	92	164	137	115	42	36	35.5	1584	35.5	0	9610	0
22	229	238	146	92	57	36	36.0	2464	36.0	0	9680	0
23	103	157	169	131	45	35	34.8	2288	34.8	0	9152	0
24	159	104	126	77	48	25	24.9	1584	24.9	0	9539	0
25	93	123	141	122	26	22	22.1	1584	22.1	0	9715	0
26	239	341	141	79	80	45	44.9	2464	44.9	0	9680	0
27	360	480	179	48	103	28	27.6	1936	27.6	0	9680	0
28	105	250	146	215	57	28	28.4	1936	28.4	0	8976	0
29	115	185	148	62	93	39	39.2	1936	39.2	0	9082	0
30	78	270	165	113	110	79	75.7	2288	75.7	0	9504	0
31	76	126	165	108	70	46	46.0	2288	46.0	0	9715	0
32	98	97	202	146	94	68	68.2	1936	68.2	0	9504	0
33	169	167	185	166	138	124	124.1	2112	124.1	0	9539	0
34	126	126	160	151	95	89	89.2	2112	89.2	0	9680	0
35	101	310	166	150	247	161	158.7	2288	156.6	2.1	8870	1760
36	188	318	145	47	114	37	37.0	1760	37.0	0	9715	0
37	215	570	212	200	127	90	90.3	2464	87.4	3.0	9680	0
38	371	824	93	62	176	89	88.8	2112	0	88.8	0	1760
39	105	274	121	61	56	36	36.0	1760	36.0	0	9680	0
40	121	186	80	51	57	32	20.9	1478	18.0	2.9	11440	0
41	174	276	155	149	33	25	24.5	1056	17.0	7.5	11440	528
42	180	231	112	104	56	44	43.9	1408	21.2	22.7	9750	1760
43	605	469	137	123	47	23	23.4	1408	23.4	0.0	9856	0
44	114	164	160	145	37	36	33.6	1408	24.5	9.1	9222	1936
45	153	265	147	120	129	94	71.1	1584	52.0	19.1	10243	1760
46	209	397	146	126	111	81	70.7	1408	44.2	26.4	9786	704
47	95	180	132	102	47	47	36.4	1408	26.6	9.8	9680	1760
48	535	373	92	53	98	57	56.8	1584	28.4	28.4	15136	2710

SN	HH	FA	GS	*GSsal*	AAC	AH	AHsal	ALC	MS of Sal	IS of Sal	AMS Price	AIS Price
	no.	ha	m3/ha	m3/ha	m3	m3	m3	Rs/m3	m3	m3	Rs/m3	Rs/m3
49	295	337	131	75	130	60	48.9	1267	41.8	7.1	11440	1760
50	107	138	120	98	34	30	21.6	1056	14.6	7.0	11088	1760
51	211	172	83	38	57	57	25.9	2112	21.2	4.7	9715	1760
52	212	134	109	45	47	47	26.3	1584	22.3	4.0	9117	880
53	297	303	84	60	29	29	21.1	1584	21.1	0	9680	0
54	176	205	187	187	36	29	29.0	1936	29.0	0	9082	0
55	425	260	155	41	60	45	35.8	1760	35.8	0	8835	0
56	214	192	119	109	43	43	31.5	1408	31.5	0	8870	0
57	848	486	84	23	113	74	31.5	1408	31.5	0	9504	0
58	197	152	189	141	43	32	31.7	1232	25.3	6.4	9504	1760
59	557	649	121	45	123	112	45.9	1584	45.9	0.0	8976	1760
60	335	313	67	56	88	69	58.6	1232	29.8	28.8	9680	1760
61	155	107	74	68	37	37	33.5	1232	33.5	0	9680	0
62	185	93	159	151	3	2	2.3	1232	0	2.3	0	2499
Total	*13858*	*16659*	*9033*	*6163*	*4697*	*3097*	*2583*	*98911*	*1931*	*651*	*520185*	*52413*
Avg.	*224*	*269*	*146*	*99*	*76*	*50.0*	*41.7*	*1676*	*31.1*	*10.5*	*9815*	*1691*

Key:
CFUG - Community forest user group
HH - Household
FA - Forest area
GS - Growing stock
GSsal - Growing stock of Sal
AAC - Annual allowable cut
AH - Annual harvest
AHsal - Annual harvest of Sal
ALC - Average logging cost
MS - Market sale
IS - Internal sale
AMS - Average market sale
AIS - Average internal sale
– Sawn timber in the forest therefore, no average logging cost
Avg. – Average

Appendix B

Survey Questionnaires

B.1 Questionnaire 1: Data collection check list from CFUG and open-ended personal interview with CFUG Respondent

Name of Project: <u>Analysis of Timber production and institutional barriers in community forestry in Terai (and Inner-Terai) Region of Nepal</u>

You are invited to participate in the project by answering the following questions.

The aim of the project is:

- *To investigate whether the institutional structure of community forestry user group (CFUG) restricting their ability to produce timber and run a profitable business.*

The questionnaire is anonymous. Participating in this interview means that you consent to participate in the project and to publish the aggregate result. You may withdraw your participation at any time during the interview, including withdrawal of any information on particular question(s) you have provided.

In this study each CFUG is considered as a social firm whose main objectives include Timber[4] *production*[5]*. The ultimate objective of a social firm is to run an enterprise for its economic benefit. A full fledge timber enterprise consists of four forestry operations: tree growing; harvesting (tree felling, logging, and log transportation); sawing; and marketing of timber.*

Respondents: *Executive Committee Members of CFUG*

District: Code:	Date:	Name of surveyor/Interviewer:

Part I: Timber production and market sales

A. Introductory information

1. ☺District:
2. ☺Year of CFUG formation:
3. ☺Number of household:
4. ☺Year of community forest handover:
5. ☺Year of the last working plan (WP) revision:
6. ☺Distance from road to CFUG: ----------Kilo metre or ----------Minute walk

Note: ☺ Information can be collected from secondary source.

[4] Timber includes log, pole, sawnwood of *Sal* (high value tree species), medium price Spp. such as *Sissoo*, *Asna*, and low price Spp. such as *Kukath*.

[5] Production is defined as the process of timber harvesting (tree felling, logging, transporting up to a depot), sawing, and marketing.

B. Resource and production

1) Forest resource characteristics
   a. ☺Community forest area: ----------(ha)
   b. ☺Production area: ----------(ha)
   c. ☺Forest stocking:
      i. ☺Volume: ---------- (Cubic foot/ha)
      ii. ☺Species and stage composition

Species composition		Stage composition (percentage)		
Species	Percentage (approx.)	Regeneration	Pole	Tree
Sal				
Medium price (MP[6])				
Low price (LP[7])				

   d. ☺Forest establishment type: Natural ☐ Plantation ☐ Mixed ☐
   e. Has your CFUG harvested timber from your CF in the last three years? Yes ☐ No ☐

If your CFUG has not harvested timber, go to question 15.

2) If yes, what were your planned and harvested amounts roughly, in the last year?

Year	Planned as per WP (Cubic Foot) ☺	Harvested (Cubic Foot)	Reasons for less or more harvesting
2006/07			

3) What were species wise details of these harvesting?

Year	Log volume (Cubic Foot)				Sawn timber volume (Cubic Foot)			
	Sal	MP Spp.	LP Spp.	Or All	Sal	MP Spp.	LP Spp.	Or All
2006/07								

4) Please give details of labour employment in harvesting timber.

Year	Log production (Man day[8])				Sawn timber production (Man day)			
	Sal	MP Spp.	LP Spp.	Or All	Sal	MP Spp.	LP Spp.	Or All
2006/07								

5) If CFUG has contracted out timber harvesting, give **details of contracting payments**.

Year	Log production[9] (NRs.)				Sawn timber production[10] (NRs.)			
	Sal	MP Spp.	LP Spp.	Or All	Sal	MP Spp.	LP Spp.	Or All
2006/07								

[6] Medium priced species are S*issoo, Ashna, and like*.
[7] Low price species is *Kukath.*
[8] Generally eight hours working a day for felling, delimbing, and logging tree.
[9] Labour quantity can be estimated roughly by dividing this amount by the average labour wage.
[10] Same as 6.

6) What was the money payment basis (tick)?
   a. Per unit volume (log/sawn timber) b. Per unit labour man day
   c. Lump sum d. Other (please specify)----------

7) Administrative labour input for harvesting timber
   (NB: Include those hours of work, which are involved in the decision making and management related to timber harvesting only, nothing else)

Year	Assembly meeting[11] (Man day)	Exe. Committee meeting (Man day)	Coordination with DFO (Man day)	Monitoring /management (Man day)	Others (if any)
2006/07					

8) What kind of harvesting equipment was used in harvesting? Please list them below:
   a. ---------- b. ---------- c. ----------
   d. ---------- e. ---------- f. ----------

9) How did you transport your logs or sawn timber from the forest to timber depot?
   a. Manual (labour) b. Bullock and cart c. Tractor
   d. Truck e. Combination of --------- Other (please specify) --------

10) What are the key factors that contributed to your timber harvesting ability?

11) Timber harvesting and administrative labour cost estimation

Year	Labour cost Average wage rate (NRs)	Administrative labour cost Average wage rate (NRs)	Remarks
2006/07			

12) Other management cost
   a. Working Plan (WP) preparation/revision cost
      i. Approximate amount (NRs): ----------
      ii. Year of WP preparation/revision:----------
      iii. Period of WP (year): ----------

   b. Forestry technician[12] and coordination[13] cost of timber harvesting and selling

Year	Technician cost (Rs)	Coordination cost (Rs)	Other cost (if any) (Rs)
2006/07			

[11] This can be estimated as: suppose assembly meeting took place one time before timber harvesting, roughly the agenda of timber harvesting took two hours for making a decision, and the number of attendants of assembly were 90. Thee total administrative labour hour can be obtained by 1 x 2 hrs x 90 = 180 hrs, which is 22.5 Man days (after dividing by 8 hr working a day).
[12] Cost of forest technician, which are generally supplied or hired from DFO and/or NGOs, for timber harvesting.
[13] All costs related to taking permission from DFO for harvesting, transporting and selling timber.

13) Transportation[14] cost (Rs)

Year	Timber amount (Cubic Foot)	Transportation cost (Rs)	Mode of transportation	Remarks
2006/07				

14) Revenue estimation

a. Internal sell/use

Year	Species.	Timber sold (Cubic foot)	Revenue (Rs)	Self used timber[15] (Cubit foot)	Local market price[16] (Rs)
2006/07	Sal				
	MP				
	LP				

b. External sell

Year	Timber Species	Timber amount (cubic foot)	Revenue (Rs)	Remarks
2006/07	Sal			
	MP			
	LP			

c. How do you sell timber outside CFUG and explain main reasons?

Market Governance[17]	Reasons (please explain)
Auction (spot market)	
Contractual arrangement	
Other (if any) ----------	

d. If you have harvested and sold internally only, what were the key reasons for this?

e. Current stock of timber

Year	Timber Species	Timber amount (Cubic foot)	Remarks
2006/07	Sal		
	MP		
	LP		

[14] This cost includes transportation of timber from CF to a depot.

[15] Such as community building, bridge, school construction and other welfare activities.

[16] Internal sell is very subsidised, therefore, proxy market price is taken from nearby town (NRs per cubic foot timber).

[17] Market governance is taken as a relative form of integration with external organisation in market place. The governance can be in the form of spot market, contractual arrangement, and hierarchy as a firm. The contractual arrangement of CFUG can either be a cooperative form with other CFUGs or with private firms such as log buyers, saw-millers, timber wholesalers/retailer.

Part II: Organisational capacity of a CFUG

C. Other resources

1. If you have not harvested timber in the last three years, why not please explain?

2. Physical capital[18]
   a. What are the physical capitals that your CFUG posses for the following activities?

Forestry activity	Yes	Type
Logging	☐	----------
Transporting	☐	----------
Sawing	☐	----------

   b. Do you have limitation of physical capitals in harvesting and selling timber at your CFUG? Please explain.
   c. Do you have limitation of financial capital in harvesting and selling timber at your CFUG? Please explain.

3. Human capital
   a. What forestry activities do you carry out at your CFUG?

Forestry activities	Carry out	Trained[19] staff	No. of trained staff	Types of training
Logging	☐	☐	----------	----------
Transporting	☐	☐	----------	----------
Sawing	☐	☐	----------	----------
Selling	☐	☐	----------	----------

   b. Does the Executive Committee of your CFUG have experience to make a decision and manage your group for growing tree, harvesting and selling timber?

Management skill	Yes	Experience
Internal (group)	☐	---------- Years
External (DFO)	☐	---------- Years
Business	☐	---------- Years

   c. Do management skills of the Executive Committee limiting timber production and market sales?

(NB: Both human and physical capitals of CFUG are considered as important asset specific investment[20] to run timber enterprise)

D. Property rights[21] and investment

1. Who owns the community forest Who owns the community forest land?

2. Who owns log/sawn timber from your community forest?

3. Can the CFUG harvest timber? If no, why not?

---

[18] Physical capital includes tree harvesting, logging, transporting equipment or machine, building, sawmill, road, store, etc.
[19] Skilled human resource by training or experience on forestry operation like nursery management, plantation, thinning, logging, sawing, and marketing. Nursery foreman, Forester and higher qualification holder, local sawer are examples.
[20] A specialised investment that cannot be redeployed to alternative uses or by alternative users except at a loss of productive value (Williamson, 1999).
[21] Property rights can be defined as the full ownership, which include the right to sell/handover asset or the services of the asset and receive the return from the asset.

4. Can the CFUG distribute or process timber obtained from CF?

5. Can the CFUG sell timber to anybody/party that the CFUG want? Please explain.

6. Are you constrained to spend your revenue from timber sales in the way you can?

7. What are the activities that your CFUG spend money on?

8. Can you borrow money from a financial institution putting your forest or WP or timber as collateral? If not, explain why?

9. What are your CFUG's sources and rough amount of fund in the last two years?

Source	Year 2006/07 (Rs)	Year 2005/6 (Rs)	Remarks
1. Members investment			
2. Sale of timber			
3. Sale of other forest product			
4. Government agency			
5. Loan			
6. Others			

10. What is the current balance of your CFUG fund? Rs. ----------(Roughly)

11. What are the most important investments necessary to scale up timber production or increase productivity at your CFUG? Please list below in an order of importance?
    i. ----------(Most important)
    ii. ----------
    iii. ----------(Important)

12. Are you making the investment you identified above? Yes/No

13. If not, what stops you investing, explain?

E. Decision making and policy issues

1. How do you determine the species and amount of timber harvest?

Basis	Yes	Comments
Working plan	☐	- - - - - - - - - - - - - - - - - - - -
DFO permission	☐	- - - - - - - - - - - - - - - - - - - -
CFUG need	☐	- - - - - - - - - - - - - - - - - - - -
Market demand	☐	- - - - - - - - - - - - - - - - - - - -
Others (Specify)----------	☐	----------

2. What is the basis for your group for whether or not to sell log timber outside? For example, surplus from the internal sell, market demand, etc.

3. What are the authorities given to the Executive Committee by your CFUG to make efficient decision for harvesting and selling timber?

4. If authority is given or not given, explain why?

5. Are there any internal barriers for decision making explain?

6. Are there any external barriers for decision making, explain?

7. What are your CFUG's objectives (interests) of community forestry management?

8. Do you have disagreements at your CFUG, particularly on growing, harvesting and selling timber?

9. How do you handle disagreement in management decision?

10. Do you have well written roles, responsibilities and community rules for members and executive committee in your constitution?

11. Does your CFUG have other disagreements? What are they, please explain?

12. How do you get market information of timber and timber industry such as price, demand, market intermediaries?

13. Could you please tell me the average sale price per unit Sal log timber at your CFUG gate and per unit Sal sawn timber at retail market?

14. What do you think about the net profitability of timber?

15. What do you think about the market power between the log/timber buyers and CFUGs?

16. Do you see any policy constraints or external barriers to produce timber and run a timber enterprise by your CFUG? What are they, explain

F. Relationship with external organisation

1. Which are the important external organisations to your CFUG for timber production?

2. What do you think/believe the role and actual support of DFO that your CFUG is getting for the following activities:

Activities	Role of DFO	Actual support to CFUG
Growing tree	- - - - - - - - - - - -	----------
Harvest tree	- - - - - - - - - - - -	----------
Process timber	- - - - - - - - - - - -	----------
Selling timber	- - - - - - - - - - - -	----------
Others ----------	----------	----------

3. Does your CFUG have any differences in opinion with DFO about necessity of permission from DFO, for example, for timber harvesting, transportation, selling, etc.?

4. Have you encountered any problem to your CFUG from DFO for timber growing, harvesting and selling?

5. If you encountered a problem what was the cause (e.g. change in policy or personal interpretation of government staff)?

6. Do you have local Non-Governmental Organisation (NGO) helping to your CFUG for timber growing, harvesting, processing and selling?

   ☐ Yes ☐ No

   If yes, what are the supports that your CFUG is getting from these NGOs?

7. Does your CFUG get support from other organisations such as village development committee (VDC), chamber of commerce, for running timber enterprise?

Part III: Vertical integration through contracting and cooperatives

1. Do you have any kind of cooperative arrangement with neighbouring CFUGs to run a timber enterprise? For example, joint protection of trees, harvesting, transporting?

   a. Do you see any benefit for your CFUG of cooperative arrangement with one or more neighbouring CFUGs? What are they and why?
      If not, why?

   b. If you see benefit but have not started such arrangement, what are constraining factors to your CFUG?

   c. Tell me your opinion, how this (these) constraining factor(s) can be reduced?

2. Likewise, does your CFUG have any contractual arrangement with private firm such as log buyers, sawmillers, wholesaler/ retailer??

   a. Do you see any benefit of contractual arrangement with private firms? What are they and why
      If not, why?

   b. If you see benefit but have not started, what are constraining issues to make such contractual arrangement?

   c. Tell me your view, how this (these) constraining issue(s) can be reduced?

3. Do you think there is market uncertainty of timber in the future?

   ☐ Yes. Why? ----------
   ☐ No. Why? ---------

   If yes, how the market uncertainty is influencing your decision making of contracting with private firms?

4. Do you think/believe private firm's commitment can not be trusted for contracting?

   ☐ Yes. Why? ----------
   ☐ No. Why? ----------

   If yes, how the untrustworthiness of the private firms is influencing your decision making of contracting with private firms, explain?

5. Similarly, is there policy/legal uncertainty for contracting with other CFUGs or private firms?

   ☐ Yes. Why? ----------
   ☐ No. Why? ----------

If yes, how the policy/legal uncertainty is affecting your decision making of contracting with other CFUGs and private firms?

6. Do you think other uncertainties, such as protection of forest, volume and quality of timber, etc. are also affecting decision making of contracting with other CFUGs and private firms?

7. Which organisation do you think can play a good role for establishing a contractual arrangement with other CFUGs and private firms, and why?

8. Do you see any policy constraint to establish CFUG cooperative for timer production and selling? What are they, please explain?

9. Likewise, do you see any policy constraint for contracting with a private firm (say sawmill). For example, CFUG can guarantee timber supply in exchange of bringing financial capital from private firm. What are they, please explain.

10. Tell me about the enforcement law or mechanism of cooperative arrangement of CFUGs that can be applied to run a timber enterprise.

11. Finally, tell me about the enforcement law or mechanism of contractual arrangement with private firm that can be applied to run a timber enterprise.

Thank you, for your time and information!

B.2 Questionnaire 2: Open-ended personal interview with Government Staff

Name of Project: Analysis of Timber production and institutional barriers in community forestry in Terai (and Inner-Terai) Region of Nepal

You are invited to participate in the project by answering the following questions.

The aim of the project is:

- *To investigate whether the institutional structure of community forestry user group (CFUG) restricting their ability to produce timber and run a profitable business.*

The questionnaire is anonymous. Participating in this interview means that you consent to participate in the project and to publish the aggregate result. You may withdraw your participation at any time during the interview, including withdrawal of any information on particular question(s) you have provided.

In this study each CFUG is considered as a social firm whose main objectives include Timber[22] production[23]. The ultimate objective of a social firm is to run an enterprise for its economic benefit. A full fledge timber enterprise consists of four forestry operations: tree growing; harvesting (tree felling, logging, and log transportation); sawing; and marketing of timber.

Respondents: *District Forest Office staff and District Cottage and Small Scale Industry Office staff*

Date:	Name or surveyor/interviewer:
District:	Code:

Part I: Organisational capacity of a CFUG

A. Introductory information

1. Office (please circle one): District/Ilaka/Range Post
2. Number of CFUG in your responsibility:
3. Main forest species in CF: ☐Sal ☐Medium price Spp. ☐Low price Spp.
4. ☺Forest establishment type: ☐Natural ☐ Plantation ☐ Both
5. How many of these CFUGs are harvesting and selling timber?
6. What are the incentives for harvesting and selling timber for CFUGs?

[22] Timber includes Sal (high value timber) and other Terai hardwood such as Sissoo, Asna.
[23] Production is defined as the process of timber harvesting (tree felling, logging, transporting up to a depot), sawing, and marketing.

B. Resource and production

1. What is the general trend of CFUG timber harvesting and sell in the last three years?
   ☐ Increasing ☐ Decreasing ☐ No change
   What are the main reasons for this trend? Please explain.

2. What do you think about the availability of timber in CFUG, for example, size of forest?
   Low or no, why?
   High or yes, why?

3. Physical capital[24] related question
   a. What physical capitals that CFUGs generally posses for the following activities?

Forestry activity	Yes	Type	Rating[25] (1 to 5 Likert scale)
Logging	☐	----------	☐
Transporting	☐	----------	☐
Sawing	☐	----------	☐
Selling	☐	----------	☐

   b. What are the most crucial physical capitals that limit production, harvesting and selling timber at CFUGs? Please explain.

   c. Is the financial capital is a limiting factor for harvesting and selling timber at CFUGs? Please explain. (Added later)

4. Human capital related question
   a. What forestry activities CFUGs normally do you carry out?

Forestry activities	Carry out	Trained[26] staff	Rating of training	Types of training
Logging	☐	☐	☐	----------
Transporting	☐	☐	☐	----------
Sawing	☐	☐	☐	----------
Selling	☐	☐	☐	----------

   b. Do the Executive Committees of CFUGs have experience to make a decision and manage group for growing tree, harvesting and selling timber?

Management skill	Yes	Experience	Rating of skill (1 to 5 Likert scale)
Internal group			
External			
Business			

   c. Do management skills of the CFUG Committee limiting timber production and market sales?

(NB: Both human and physical capitals of CFUG are considered as important asset specific investment[27] to run timber enterprise)

[24] Physical capital includes forest, equipment for tree harvesting, logging, transporting, sawing, and infrastructure such as building, road, store, etc.
[25] Likert scale: 1 for none; 2 for some; 3 for moderate; 4 for high; 5 for very high.
[26] Skilled human resource by training or experience on forestry operation like nursery management, plantation, thinning, logging, sawing, and marketing. Nursery foreman, Forester and higher qualification holder, local sawer are examples.
[27] A specialised investment that cannot be redeployed to alternative uses or by alternative users except at a loss of productive value (Williamson, 1999).

C. Property right and investment related questions

1. Who has the ownership of community forest?

2. Who owns log/sawn timber from community forest?

3. Can a CFUG harvest timber or they required to obtain a permit?

4. Does CFUG have full right to use log/sawn timber obtained from CF?

5. Can CFUGs sell timber from CF to anybody/party they want? Please explain.

6. What is the process if a CFUG (or a group of CFUGs) would like to establish and operate sawmill on their own?

7. Can a CFUG (or groups of CFUGs) collect or buy timber from other sources and saw in sawmill?
   If yes, why and how?

   If not, why?

8. Are CFUGs free to spend revenue from timber sell on desired activity?

9. What are the common activities that CFUGs spend money on?

10. Have you encountered any property right related problem to utilise timber (harvest, process and sell) by CFUGs under the current regime? What are these problems?

11. What are the major sources of CFUG fund? Please list them.

    ii. ----------
    iii. ----------
    iv. ----------

12. In your opinion, what are the most important investments necessary to scale up timber production or increase productivity at CFUGs? Please list five in an order of importance.

    i. ----------(Most important)
    ii. ----------
    iii. ---------- (Important)

13. In your opinion, how CFUGs can raise these investments?

14. In contrast, what are the risks/problems of these investments and why?

15. What is your organisation's role in supporting CFUG to raise these investments mentioned above?

D. Decision making and policy issues

1. How a CFUG normally determine the amount and species of timber harvest?

Basis	Yes	Comments
Working plan	☐	- - - - - - - - - - - - - - - - - - - -
DFO permission	☐	- -
CFUG need	☐	- -
Market demand	☐	- -
Others (Specify) ------	☐	----------

2. What are the bases for CFUGs whether or not to sell log timber outside? For example, surplus from the internal sell, market demand, etc.

3. What are the authorities given to the Executive Committee by CFUGs to make efficient decision for harvesting and selling timber?

4. If authority is given or not given, explain why?

5. Do you think/believe there are external barrier to CFUG for producing and selling timber, for example Government decision for not cutting green tree?

6. The decision making process of timber harvest and sell of CFUG is:

Simple	☐	Why?	- -
Complicated	☐	Why?	- -

7. In your opinion, what are CFUG's objectives (interests) of community forestry management?

8. Do you think, they have objective (interest) conflicts at CFUGs, particularly on growing, harvesting and selling timber?
   Yes, why? ---------
   What are they? ------

9. Generally, how do CFUGs handle objective (interests) conflicts in management decision?

10. Do they have well written roles and responsibilities of members and executive committee and communities rules in your constitution?

11. Do they have free riding problems such as members do not pay membership fee but demand for more timber on subsidised price, shirking (offending) community rules?

12. Tell me, generally how CFUGs handle disputes?

13. How do they (CFUGs) get market information of timber and timber industry such as price, demand, market intermediaries?

14. Could you please tell me the average sell price of per unit Sal log timber at CFUG and Sal sawn timber at market?

15. Do you think the net profitability of timber is high? If yes, what ways? If not, why?

16. Do you see any policy constraints to run a timber enterprise by CFUG? What are they?

E. Relationship with external organisations

1. Which are the important external organisations to CFUGs for timber production?

2. What are the role of DFO and actual support that you are providing to CFUGs for the following activities:

Activities	Role of DFO	Actual support to CFUG
Harvest tree	- - - - - - - - - - - -	----------
Process timber	- - - - - - - - - - - -	----------
Selling timber	- - - - - - - - - - - -	----------
Others ----------	----------	----------

3. Are there local Non-Governmental Organisation (NGO) helping to CFUG for timber growing, harvesting, processing and selling?
   Yes / No.
   If yes, what are the supports that these NGOs providing to CFUGs?

4. Are there other organisations such as village development committee (VDC), District Development Committee (DDC), chamber of commerce, which are helping CFUGs for running timber enterprise?

Part II: Vertical integration through contracting and cooperatives

1. Are there any kinds of cooperative arrangements among CFUGs to run a timber enterprise? For example, joint protection of trees, harvesting, transporting?

   a. Do you see any benefit to CFUGs of cooperative arrangement with one or more neighbouring CFUGs? If yes, what are they and why?
      If no, why?

   b. If you see benefit but have not started such arrangement among CFUGs, what are constraining factors?

   c. Tell me your view, how this (these) constraining factor(s) can be reduced?

2. What is the administrative process of cooperative formation for CFUG timber production and sell?

3. Likewise, are there any contractual arrangement between CFUG and private firm such as log buyers, sawmillers, wholesaler/retailer? Yes/No.

   a. Do you see any benefit of contractual arrangement of CFUGs with private firms? If yes, what are they and why?

      If not, why?

   b. If you see benefit but CFUGs have not started, what are constraining issues to make such contractual arrangements?

   c. Tell me your view, how this (these) constraining issue(s) can be reduced?

4. Do you Do you think there is market uncertainty of timber in the future?
   - ☐ Yes. Why? ----------
   - ☐ No. Why? ---------

   If yes, how do you rate the market uncertainty in the following 5 graded likert scale?

   ☐ 1 Very low ☐ 2 Low ☐ 3 Moderate ☐ 4 High ☐ 5 Very high

5. Do you think/believe contractual commitment between CFUGs and private firm's can't be trusted for contracting?
   - ☐ Yes. Why? ----------
   - ☐ No. Why? ----------

   If yes, how do you rate their contracting commitment in the 5 graded likert scale?

   ☐ 1 Very low ☐ 2 Low ☐ 3 Moderate ☐ 4 High ☐ 5 Very high

6. Similarly, is there policy/legal uncertainty for contracting between CFUGs or private firms?
   - ☐ Yes. Why? ----------
   - ☐ No. Why? ----------

   If yes, how do you rate the policy/legal uncertainty for contracting between CFUGs and private firms in the 5 graded likert scale?

   ☐ 1 Very low ☐ 2 Low ☐ 3 Moderate ☐ 4 High ☐ 5 Very high

7. Do you think/believe there are other uncertainties such as protection of forest, volume and quality of timber, etc. for contracting?

8. In your opinion, which organisation can play a good role for establishing a contractual arrangement with other CFUGs and private firms? And why?

9. What are the enforcement mechanisms of cooperative arrangement of CFUGs to run timber enterprise?

10. Likewise, what are the enforcement mechanisms of contractual arrangement of CFUGs with private firm to run timber enterprise?

11. Do you see any policy constraint to establish CFUG cooperative for timer production and selling? What are they, please explain.

12. Finally, do you see any policy constraint for contracting between CFUGs and private firm (say sawmill). For example, CFUG can guarantee timber supply in exchange of bringing financial capital from private firm.

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Thank you, for your time and valuable information!

B.3 Questionnaire 3: Open-ended personal interview with Private firm[28] Respondents

Name of Project: Analysis of Timber production and institutional barriers in community forestry in Terai (and Inner-Terai) Region of Nepal

You are invited to participate in the project by answering the following questions.

The aim of the project is:

- *To investigate whether the institutional structure of community forestry user group (CFUG) restricting their ability to produce timber and run a profitable business.*

The questionnaire is anonymous. Participating in this interview means that you consent to participate in the project and to publish the aggregate result. You may withdraw your participation at any time during the interview, including withdrawal of any information on particular question(s) you have provided.

In this study each CFUG is considered as a social firm whose main objectives include Timber[29] production[30]. The ultimate objective of a social firm is to run an enterprise for its economic benefit. A full fledge timber enterprise consists of four forestry operations: tree growing; harvesting (tree felling, logging, and log transportation); sawing; and marketing of timber.

Respondents: Log buyers, Sawmill owner, and Timber retailer

District: Code:	Date:	Name or surveyor/interviewer:

Part I: Organisational capacity of Private firm and Importance of CF

A. Resource and production

1. Years of business:
2. What is the nature of your firm? Also, provide me approximate amount of turnover, number of staff, operation time. Your firm might fall in more than one stage in the following table.

Nature of business	Annual turnover (Volume or Rs approx)	Number of staff	Operating days in the year
a) Log buyer			
b) Saw miller			
c)Wholesaler/retailer			

[28] Timber intermediaries: log-buyer, saw-miller, wholesaler/retailer
[29] Timber includes Sal (high value timber) and other Terai hardwood such as Sissoo, Asna.
[30] Production is defined as the process of timber harvesting (tree felling, logging, transporting up to a depot), sawing, and marketing.

3. Tell me your sources of timber including other details such as species, average price, and percentage and regularity of supply that applies in your case given below:
   a) Community Forest

   b) Private Forest

   c) Government Forest

   d) Own Forest (if any)

4. What are the problems/risks of getting supply from these sources?

Log supply	Problems/risks
Community forest	
Private forest	
Government auction	
Own forest	

5. How do you buy timber from suppliers and explain main reasons?

Market Governance[31]	Reasons (please explain)
Auction (spot market)	
Contractual arrangement	
Other (if any) ----------	

6. Forest resource
   a. Do you have your own forest? If yes, what are the advantages of having own forest? If not, why you don't grow your own forest?
   b. What do you think about the importance of Sal forest of CFUGs? If not, why?

7. Physical capital[32]
   a. What kind of physical capitals your firm currently own or rent? And what is the approximate market value of these capitals?

Physical capital	Approximate Market value (NRs)	Remarks
1. 2. 3.		

   b. What are the most crucial physical capitals to your firm that limit your timber production and business?

[31] Market governance is taken as a relative form of integration with external organisation in market place. The governance can be in the form of spot market, contractual arrangement, and hierarchy as a firm. The contractual arrangement of CFUG can either be a cooperative form with other CFUGs or with private firms such as log buyers, saw-millers, timber wholesalers/retailer.

[32] Physical capitals include forest, equipment for tree harvesting, logging, transporting, sawmilling, and infrastructure such as building, road, store, etc.

8. Human capital: What forestry activities does your firm carry out? And what is the training/experience status of your firm?

Forestry activities	Carry out	Trained[33] staff	No. of trained staff	Types of training
Transporting	☐	☐	----------	----------
Sawing	☐	☐	----------	----------
Selling	☐	☐	----------	----------

(NB: Both human and physical capitals of CFUG are considered as important asset specific investment[34] to run timber enterprise)

B. Property rights[35] and investment

1. Can you buy, own, transport, process, sell or lease timber as you like, explain?

2. Have you encountered any property right related problem to utilise (process and sell) timber under the current regime? What are these problems?

3. Can you borrow money from a financial institution against your property such as sawmill, timber, contracts, explain?

4. What are the most important investments necessary to scale up timber production or increase productivity at your firm? Please list below in an order of importance?

   ---------- (Most important)

   ---------- (Important)

5. Are you making the investment you identified above, how?

6. If not, what stops you investing, explain?

C. Decision making

1. Tell me what determines you to make decision whether or not buy timber from CFUG?

2. Likewise, what determines you to make decision whether or not buy timber from other sources?

3. Are there any external barriers such as Government directives for processing or transportation to make efficient decision to your firm?

4. How do you get market information of timber such as price, demand, supply?

5. Could you please tell me the average buying price per cubic foot Sal log timber at the CFUG gate and your selling price per cubic foot of Sal sawn timber?

[33] Skilled human resource by training or experience on forestry operation like nursery management, plantation, thinning, logging, sawing, and marketing. Nursery foreman, Forester and higher qualification holder, local sawer are examples.

[34] A specialised investment that cannot be redeployed to alternative uses or by alternative users except at a loss of productive value (Williamson, 1999).

[35] Property rights are defined as the full ownership, which include the right to retain/sell/handover asset or the services of the asset and receive the return from the asset.

6. Likewise, could you please tell me your estimated cost of transportation, sawing, and marketing of a cubic foot Sal timber?

7. What do you think about the net profitability of timber?

8. What do you think about the market power between your firm and CFUGs?

D. Relationship with other organisation

1. What are the most important organisations for your firm to run timber business?

2. What is the role of District Forest Office (DFO) to your firm when buying log/timber from CFUG or other sources?

3. Likewise, what is the role of DFO to your firm for other activities like transporting log/timber, sawmilling/processing, etc.?

4. Have your firm encountered any problem with DFO to run your business? What are they?

   If yes, how these problems can be avoided?

Part II: Vertical integration through contracting

1. Does your firm have any contractual arrangement with CFUG (backward integration[36])?
   ☐ Yes ☐ No
   a. Do you see any advantages of contractual arrangement with CFUG for your firm? What are they and why?

      If not, why?

   b. If you see benefit but have not started, what are constraining issues to make such contractual arrangement?

   c. Tell me your opinion, how this/these constraining issue(s) can be reduced?

2. Similarly, does your firm have any contractual arrangement with other timber grower?
   Yes, why?

   No, why? ----------

3. Does your firm have made any contractual arrangement with downstream firm like wholesaler and retailer (forward integration)?
   Yes, why? ----------
   No, why? ----------

[36] Integration can be defined as the mode of market governance structure, which are spot market, contractual arrangement, and hierarchy as a single firm.

a. Do you see any advantages to your firm of such forward integration?

b. In contrast, are there any problems of such forward integration to your firm?

c. In your opinion how this/these problem(s) of forward integration can be solved?

4. Do you think there is market uncertainty of timber in the future?
   - ☐ Yes. Why? ----------
   - ☐ No. Why? ---------

   If yes, how the market uncertainty is influencing your decision making of contracting with CFUGs?

5. Do you think/believe CFUGs' commitment can't be trusted for contracting?
   - ☐ Yes. Why? ----------
   - ☐ No. Why? ----------

   If yes, how the untrustworthiness of CFUGs' is influencing your decision making of contracting?

6. Similarly, is there policy/legal uncertainty for contracting with CFUGs?
   - ☐ Yes. Why? ----------
   - ☐ No. Why? ----------

   If yes, how the policy/legal uncertainty is affecting your decision making of contracting with CFUGs?

7. Do you think other uncertainties such as protection of forest, volume and quality of timber, etc. are also affecting decision making for contracting with CFUGs?

8. Likewise, what are the main uncertainties of contracting with downstream firms (forward integration)?

9. Have you encountered any policy constraints while running your business?

10. Do you see any policy constraint to establish contractual arrangement with CFUGs? For example, your firm can inject capital to CFUG in exchange of guaranteeing timber supply.

    If yes, how these problems can be resolved?

11. Tell me about the enforcement law or mechanism of contracting with CFUGs that can be applied to run your enterprise.

12. Finally, tell me about the enforcement law or mechanism of contractual arrangement with private firm that can be applied to run a timber enterprise.

13. Did you have any past experience of enforcement problem of contract breaking with any party? Please explain.

Thank you, for your time and valuable information!